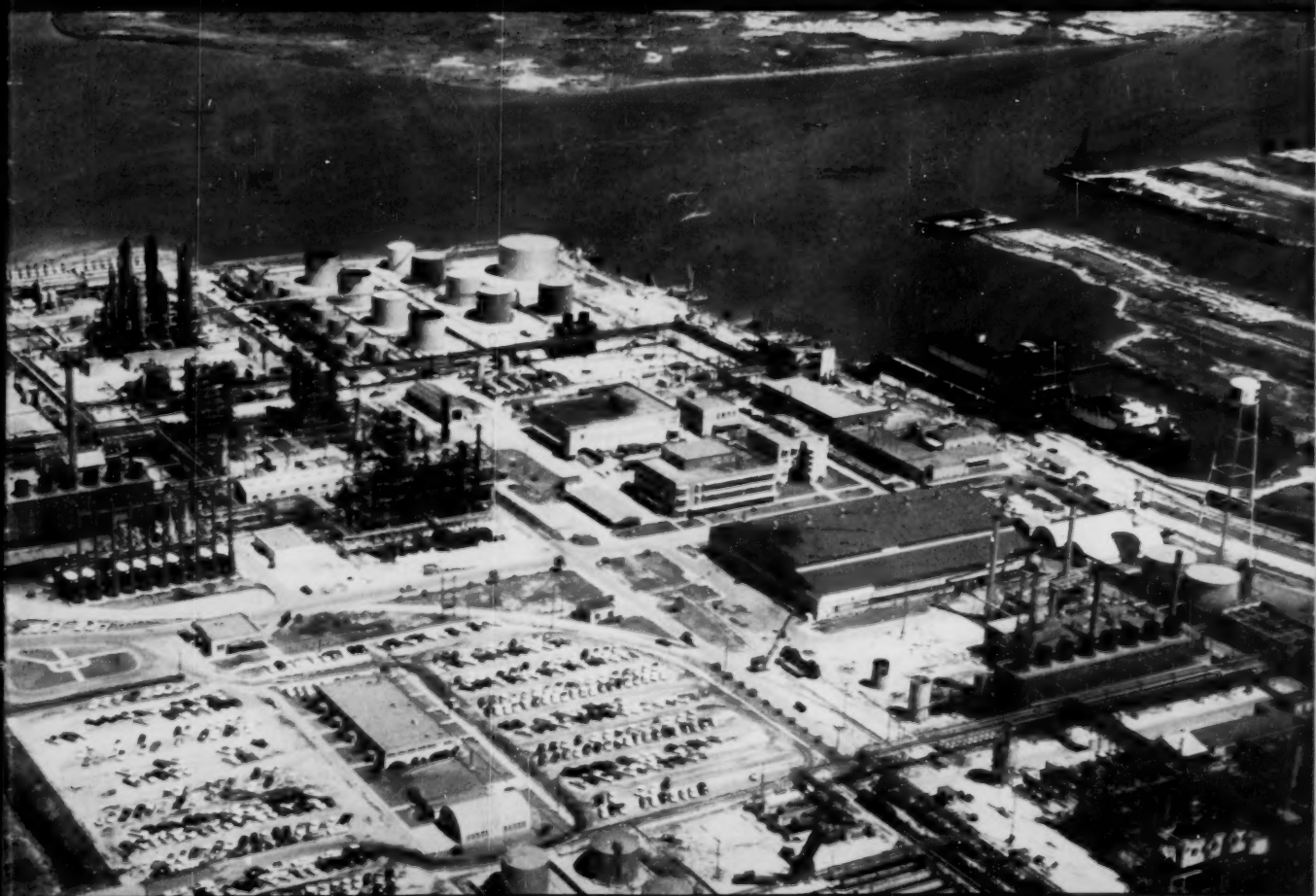


THE MAGAZINE OF

Standards



... how to start a standards program page—97

APRIL 1958

THE MAGAZINE OF *Standards*

Published monthly by the
AMERICAN STANDARDS ASSOCIATION,
INCORPORATED.
70 East Forty-fifth St., New York 17, N. Y.

VOL. 29

APRIL 1958

NO. 4

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Our Cover



Photos—Courtesy
Monsanto Chemical Co.

The Monsanto Chemical Company's Texas City plant produces such items as styrene monomer, vinyl chloride monomer, acrylonitrile monomer, polyethylene polymer, and methanol. For article on how Monsanto started its standards program, see page 97.



Single copy 60¢. \$7.00 per year (foreign \$8.00). Schools and libraries \$5.00 (foreign \$6.00). This publication is indexed in the Engineering Index and the Industrial Arts Index. Re-entered as second class matter Jan. 25, 1954, at the Post Office, New York, N. Y., under the Act of March 3, 1879.

Opinions expressed by authors in THE MAGAZINE OF STANDARDS are not necessarily those of the American Standards Association.

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Two of Monsanto Chemical Company's standards engineers give the history of the company's centralized standards program, tell how the program is now organized, how work of the American Standards Association helps, and why the company finds that its standards program pays.

Standardized Measurements Produce Compatible Components.

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A Sheffield Corporation executive explains that some standards may serve as dictionaries for designers and help smooth the path from development design to the shop. He describes the five basic elements that determine the accuracy of linear measurement and shows how increasing precision requirements of research and development work have changed the instruments found in model or experimental shops.

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• **Concerned with** getting the most production, efficiency, and value from the money they put into their production, many companies are organizing to put standards to work. How the Monsanto Company is set up to get the most value out of standards is described on page 97.

The ASA Company Member Conference also has emphasized this theme in developing its Spring Meeting, at Detroit's Sheraton-Cadillac Hotel, April 29 and 30.

Talks on how to organize company standards work; a panel and workshop discussions on specific problems of standards application; and a panel discussion on how standardization can help in the cost-price squeeze will be features of the meeting.

H. E. Chesebrough, Director, Product Planning, Chrysler Corporation, and member of ASA's Board of Directors, representing the Automobile Manufacturers Association, will open the meeting. He will present some of ASA's problems in carrying on its work. The balance of Tuesday morning will be devoted to organization of the company standards program. B. Scott Liston, Diamond Alkali Company, Cleveland, and Dale Engstrom, Cutler-Hammer, Inc, Milwaukee, will describe how to organize for company standards.

Tuesday afternoon will feature specific problems involving Class 5 interference-fit screw thread, standard thickness of electroplate on steel parts, and standards for controlling the color of paint finishes.

On Wednesday morning the CMC will hear papers on how standardization can help simplification by E. R. Friesth, Deere and Company, Moline, Illinois; how standards can help in the cost-price squeeze by C. W. Stockwell, International Harvester Company; and the relationship of specials to standards by R. F. Holmes, A. C. Spark-Plug Division, General Motors.

On Wednesday afternoon CMC members will have an opportunity to visit the Ford Motor Company, Rouge Plant; Burroughs Corporation, Plymouth Road Plant; and General Motors Corporation, Technical Center.



This Month's Standards Personality

DR KENNETH C. PEACOCK, Industrial Medical Association's liaison committee chairman and representative on the Safety Standards Board of the American Standards Association, is one of this country's leading exponents of diagnostic-preventive medical work. He is founder and director of the Occupational Medical Services, New York. This unique organization offers a clinic for use by smaller industries that cannot maintain complete medical departments in their own plants. This system has one important advantage. The staff of physicians and surgeons who service the clinic maintain close touch with clinical medical progress by keeping up their individual practices, medical teaching, and hospital work. Under Dr Peacock's leadership, they emphasize diagnosis to determine and treat the cause of disabilities and to keep employees on the job, thus helping to prevent unnecessary loss both to employees and to their employers.

Dr Peacock is enthusiastic about the work being done by nearly 40 eminent doctors who represent the Industrial Medical Association in the ASA committees on industrial safety and health standards. "The officers and extensive membership of the Industrial Medical Association are directly associated with the medical safety problems of industry," he says. "They appreciate greatly the opportunity of responding to the requests of your working committees to furnish highly trained medical specialists. Here, they assist in an approach to industrial safety and health problems that begins with development of safety standards."

How important this safety standards work can be to industry was pointed out to him a number of years ago, he says. He was told that, in one important industry, 75 percent of modifications in standards for machine tools and other equipment were developed because of accidents that resulted in shutdown time in the plants.

As a student in medical school, Kenneth Peacock had the advantage of a pioneering approach to medical education. He was selected by Dr Albert Ochsner to work in the Ochsner and Percy Clinic during college and medical school summer vacations. Following internship at Washington University and Army duty he returned to this clinic for a three-year residency in surgery. Today, Dr Ochsner's method of teaching through practice is standard.

Dr Peacock has had 30 years of practice in general surgery and industrial medicine in New York City, following ten years as a surgeon in Sioux City, Iowa, and service in the Orthopedic Surgery Division of the Army during World War I. He is Associate Professor of Surgery at New York Medical College, the Flower Fifth Avenue Hospital, Bert Collier Hospital, and Metropolitan Hospital. He practices as a surgeon at the Midtown and Yonkers General Hospital in New York. In addition to his Occupational Medical Services clinic, he is in charge of medical departments of a large number of companies. As to the value of this work with industry, Dr Peacock quotes a well informed industrialist, "The medical dollar produces more than any other dollar spent in industry."

A Fellow of seven medical and surgical associations, Dr Peacock's personal hobbies are hunting, fishing, golf, hand-loading ammunition, and fly tying.



Photos—Monsanto Chemical Co.

Monsanto's standardization program, begun in 1953, is now bearing fruit. How they started is told in this article.

Left—Monsanto's John F. Queeny plant at St. Louis. Here, Monsanto manufactures functional fluids, herbicides, organic intermediates, pharmaceuticals, plasticides and resins, and synthetic flavors and condiments.

Below—The Protective Coatings Standards Project Committee, typical example of the cross section of the company which contributes experience to the standards program. It not only contains representatives from various plants of the several manufacturing divisions of Monsanto but also includes members from the research and engineering division and purchasing and safety departments.



How to Start a Standards Program

by D. C. Brand and C. W. Sisler

Mr Brand is coordinator of standards and Mr Sisler is staff engineer of the Standards Section, in the Engineering Department of the Monsanto Chemical Company, St Louis, Mo. Mr Brand represents the American Society for Testing Materials on the Chemical Industry Advisory Board of the American Standards Association. He is also a member of the Company Member Conference of ASA. He started the standards program for Monsanto's Organic Chemicals Division in 1953. Concerning standards, he says, "There is now a revitalized interest in standardization within the chemical industry. This is manifested through the formation of the Chemical Industry Advisory Board of ASA in 1950, and the formation of the Mechanical Technical Committee within the Manufacturing Chemists' Association just two years ago. In addition to other national activities such as the current pump standardization program and the heat exchanger standards project now before ASA, interest in company standards is on the rise as well."

STANDARDIZATION is not new at Monsanto. Since the company was established just after the turn of the century, standards were adopted in one form or another, first in the parent plant in St Louis, then in other plants and divisions as the company grew into a world-wide organization. There are records of paint standards for the John F. Queeny Plant, extending back to 1917. These provide quaint reading in this era of specialty coatings. Piping standards for several plants are more recent, dating back to 1935.

Early standards were usually based upon independent judgment factors of engineers and foremen employed in the various plants. They might be altered or even discarded with each change in plant administration. There is evidence that at least several new administrations reviewed the totality of standards experience which preceded them as a guide for contemporary application. However, there is little evidence of effort toward centralized control. Several attempts, usually verbal and often unrecorded, were made to coordinate plant standards with plant purchasing policies.

Period of Adolescence

There were several reasons why a centralized standards program could hardly succeed during the early years of Monsanto's history. The basic reasons were growth and rapid expansion.

During this period the company concentrated on developing new products and new processes. In short, it was manufacturing chemicals with all its cost consciousness focused on raw materials and low capital investment. The technology of mechanical engineering in chemical plants was embryonic; the economic advantages of standard equipment and parts interchangeability

were largely unconsidered; preventive maintenance was still an untested theory.

Monsanto was not unique in its expansion during this period, which saw the entire chemical industry come of age. An intense concentration upon growth and expansion characterized many of the major chemical companies during the first decades of the century. It is dangerous to generalize from inadequate data, but we suspect that equipment selection and maintenance precedents were established at this time which set the pattern for costly and inefficient procedures in the years immediately following.

By the latter part of the 1930's there was a growing maturity. The war economy of this period demanded capacity production and brought an awareness that a change in thinking was needed within the industry. This awareness became a conviction when, with new construction severely limited, production capacities of existing plants were taxed to the limit by constantly increasing sales. In addition, continuous processes were coming into focus, placing shutdown time at a premium. Repair time assumed a new importance.

In order to protect production, equipment parts inventories soared to new heights. The ingenuity of engineers was challenged by each equipment breakdown because of the need for adapting interchangeability and dependability from parts not necessarily manufactured for the damaged or worn equipment item. In short, both the criteria for quality and the maintenance practices were brought forcefully into the limelight—and found wanting.

Period of Introspection

Continued high production at the end of the war focused attention on a dilemma faced not only by Monsanto, but by other chemical producers as well. High inventories were essential to protect the multiplicity of equipment against the need of high production. Yet, both high production and low storeroom inventories were considered essential.

Events leading up to this dilemma had been complicated. Company expansion had been continued and wartime goals had been reached in a satisfactory manner. Effective work had been done by men who moved toward their goals. So, in undertaking a detailed study of the problem, it was necessary to avoid preconceived ideas or the assumption of a kind of prescience regarding results of actions others had taken. Our study was based on the premise that to understand the reasons why we acted as we did was more important than to speculate on what might have been.

The study of what had gone before defined a complex problem:

1. Exercise of independent judgment by many people over many years had resulted in a great variety of brands, styles, types, shapes, and sizes of mechanical equipment items. To illustrate the situation, one plant had installed approximately 1,200 pumps of 425 different styles, with more than 100 manufacturers represented. Storeroom inventory could not carry a complete

coverage of spares and parts for all of these various pumps, yet the total storeroom inventory had reached a peak where reduction was mandatory. The situation was compounded when we found that pressure vessels, agitation equipment, and the entire range of mechanical equipment and materials also shared a common lack of coordination in selection methods.

2. Multiple styles of similar equipment prevented interchangeability in mounting dimensions and methods. This is expensive from the standpoint of inventories, as well as in maintenance cost and production loss.

3. Interchangeability of equipment, parts and spares between equipment within a plant—let alone between plants—was next to impossible because of the lack of common dimensional, design, engineering, and specification standards. A plant needing a pump replacement could seldom obtain the replacement from another plant with a large inventory of pumps of similar capacity because of dimensional differences.

4. In addition, there was an inadequate technology for research and evaluation of equipment and materials. Damaged materials and equipment were being replaced with like materials and equipment, with scant attention to the possibility of cost reduction through increased service life from more suitable materials and equipment.

5. Engineering activity was conducted independently on central, divisional, and plant levels, with little intercommunication of ideas.

6. Purchasing of equipment and materials depended upon the specific requests of engineers. Sources of supply were usually selected according to engineering preference. A lack of equipment and materials specifications hampered purchasing activity.

Period of Resolution

These studies reported both definitive and broad concepts of standardization. The report suggested that a central standards program might serve to solve the existing problem, while providing a broad base for concepts which would prevent recurrence of the problem. On the recommendation that such a program be attempted, management granted approval, and the general engineering department was authorized to formulate and implement the program. Formal operation of the Monsanto standards program began on January 1, 1953.

The stated objective of the program as it was set up was cost reduction. This was to be achieved through control of stores inventories, through savings in design time and cost, savings in maintenance time and cost, and through development of specifications for use by the purchasing department.

Period of Fulfillment

Monsanto's progress in standardization is the result of evolution from a broad field of uncoordinated effort, based upon custom and independent judgment; through a period of standardization by adjudication; toward standardization based upon evaluation and cost comparison reached by participation of representative personnel from all levels of company activity. The basis for

selection of standards subjects has evolved from an initial consideration of several factors of cost reduction, to a broader consideration of economic advantage to the company. Priorities for the study of various aspects have been established according to the expected return on our investment in time and effort.

The years immediately following inception of the program were a transition period during which we learned much about the methods of implementation, the scope of application, and the real objectives of our efforts. Our philosophy of standardization in 1953 was necessarily based almost entirely upon Monsanto experience and custom. We learned that plant precedent and authority were highly prized, and that there was a tendency to resent the issuance of central standards which might be suspected of contravening local decision. Centralized standardization had to be slowly and patiently explained.

Since the theory of equipment and material selection on the basis of evaluation, comparison, and extended service life had not yet gained wide acceptance, the Central Standards Group became a standards-writing agency. Early effort of the group was mainly concerned with compiling a guide for technical practice. We then turned toward Standards Engineering and Store Specifications. We established a system of study, review and

final approval of proposed standards which enabled plant, divisional and central personnel to have equal voice in considering merit and application.

The program continued to evolve, with flexibility in meeting objections to the method, pace, and scope of implementation which arose from time to time. Initially, there was a skeptical acceptance of the program. However, with time, plants and divisions began to request that the program be accelerated along certain specialized lines to assist in controlling their rising costs.

By the end of 1956, evolution and acceptance of the program had altered the position of the Central Standards Group from that of a standards-writing agency, to a coordinating medium which set procedure, handled costs, and coordinated standardization activity. Study, evaluation, and actual writing of the standards had now become the responsibilities of committees with representatives from each company division in various engineering fields such as piping, tanks, and pressure vessels, protective coatings, electrical equipment, and so on. Control over the total program was exercised by a strong Central Standards Committee made up of top management personnel.

By now, technical specialists familiar with scientific theory and practice in each of the various fields of engineering application were providing staff assistance

What Monsanto's Standards Accomplish

With the development of standards within its own organization and with its active participation in industry-wide standardization activities, Monsanto's standards-program objectives have broadened. The past five years have shown that standards provide many advantages:

Standards can free engineers for more creative work on special problems—important in these days of technical manpower shortages. They make this possible by:

- Providing predesigned equipment for run-of-mill use.
- Providing prepared specifications for average needs.
- Providing preselected equipment for given needs.
- Providing charts, tables, dimensioning, and symbolic data for certain design items.
- Reducing duplication of effort by central, divisional and plant engineering organizations through coordination of standardization activities.

Standards can aid in purchasing by proving a basis for flexibility in purchasing department activities. They detail for the manufacturer the acceptable limits of each item standardized. They permit purchases to be made on the basis of standard specifications rather than independent judgment. Standards may eventually provide a basis for competitive bidding on annual contracts of standard items on estimated quantities.

Standards reduce capital investment in new projects. Sav-

ings in engineering and design time, speedier construction, reduction in cost through purchasing flexibility, along with decreased inspection effort, are all anticipated results. Standardization makes possible less costly start-up and adjustment periods for new installations.

Standards save investment in storeroom inventory. Standard mounting dimensions for equipment which allow interchangeability, reduction in the variety of equipment items, longer service life, are all expected results of standardization. Ease of exchange of spares and parts between plants is another potential benefit.

Standards cut down the needed investment in maintenance and repair dollars. Standard designs, improved standard equipment with longer service life as replacement items, interchangeable parts, evaluated standard coatings, linings, insulation and piping, coupled with fewer items to learn and become familiar with, should speed training, lengthen intervals between repairs, and reduce costs.

Standards make safe material and equipment a prime consideration in standards evaluation.

Standards shorten lines of communication from top management down the line to the hourly workers. They become media which express the common goal of all company employees—to produce more and better products, safely and at minimum cost.

to the working committee. Adequate coordination and good communications were insured by having on each of the working committees a member of the Central Standards Committee which was also responsible for indexing, numbering, publishing, compiling into manual form, and distributing the approved standards. During the five years of its operation, the program has made definite progress; accelerated progress, we feel, can be anticipated for the immediate future.

An Industry-Wide Trend

During the transition period, Monsanto's efforts have been aided and abetted by industry-wide standardization efforts. Monsanto has, in turn, participated in and enthusiastically supported industry-wide attempts at standardization.

Examples of industrial cooperation in standardization include the formation of a Chemical Industry Advisory Board within the American Standards Association in 1950, and of a Mechanical Technical Committee within the Manufacturing Chemists' Association, in 1956.

Recognition of problems peculiar to the chemical industry is illustrated by services of the American Society for Testing Materials in providing materials standards. The same is true of efforts of the National Association of Corrosion Engineers toward the mitigation of corrosion. Protective coatings societies have been formed in ten major chemical industrial areas for disseminating cost-reduction information in the coatings field. Activity by various committees of the American Society of Mechanical Engineers toward standard utilities equipment and procedures has been both considerable and helpful.

Beneficial results to be expected from industrial cooperation in the field of equipment standardization are best illustrated by the recent ASA project to provide standards for pumps used in the chemical industry. This project is under the supervision of the Chemical Industry Advisory Board of ASA and is expected eventually to save the chemical industry alone some \$6,800,000 annually.

This article, reprinted from the February 10, 1958, issue of Chemical Engineering by special permission, is the first of a series on standards being published by Chemical Engineering. Other articles in the series will cover what can be standardized and what savings and other benefits come from standardization. "Standardization applied specifically to the chemical process industries is relatively new," the editor of Chemical Engineering points out. "Standards can be classed as external—industry-wide standards covering such matters as screw and pipe threads, pipe, valves and fittings, and drafting and engineering symbols. These have long been familiar in many areas. Then there are internal standards set up by individual chemical process companies to simplify and reduce the cost of their own operations. In the main, these are a postwar development. Internal standards generally encompass such matters as specifications, equipment designs, and ways of doing things. For example, Monsanto recognizes six types of internal standards: (1) Standard engineering specifications; (2) design standards; (3) engineering standards; (4) standard methods and procedures; (5) inspection standards; and (6) standard engineering and stores specifications."

As we were saying...

TIME is always of the essence when it comes to getting things done. And just because time, and plenty of it, is sometimes consumed where government is involved, it is refreshing—even exciting—to print advices to the contrary, reporting high level executive action that is forthright as well as satisfying. All credit where credit is due!

The action in question is that of Commissioner McConihe of Public Buildings Service. In a memorandum, dated January 30, 1958, the Commissioner instructs all regional directors, when advertising for space, to adopt the American Standard of Floor Measurement, sponsored by our Association.

That, in itself, will be welcome news to many who read this first announcement. But the point we choose to emphasize is the time element, in particular. Here is how this action came about.

Some of our members in the Northwest, bidding on GSA space requirements, were surprised to discover that the rules governing measurement were at variance with our standard practice.

Seattle consulted the National Office, and it developed upon inquiry that regulations of long standing were involved. While it doesn't take an Act of Congress to amend established regulations, something short of that is not infrequently required.

However, our acquaintance with most branches of the General Services Administration being on a close and cooperative basis, the Association had no hesitation in pointing out an evident inconsistency since GSA, which embraces the Public Buildings Service, has at all times been a strong supporter of standardization.

As the upshot of these conversations, in which our General Counsel participated, two significant steps resulted. The first was informal, all but immediate, and quite to the point—calculated to overcome the existing impasse.

The second was formal, specific, far reaching. It involved an exchange of letters, one from the Association, and Mr McConihe's reply, addressed to the executive vice-president, from which we quote:

"We have your letter of January 16, calling attention to the conflict between the method of measurement of floor space in buildings, which is used by our regional offices in advertising for space, and the American Standard Method of Floor Measurement. . . . We are taking the necessary steps to prescribe the American Standard Method for use by our regional offices and future invitations to bid will contain the new standard."

We were right on the press when this item came through—but are cheerfully holding out the editorial we had written in favor of up-to-the-deadline news!

(signed) **W. J. McLaughlin**

This editorial is reprinted from *Skyscraper Management*, February 1958, published by the National Association of Building Owners and Managers. It refers to American Standard Method of Determining Areas in Office Buildings, Z65.1-1956, sponsored by the National Association of Building Owners and Managers and the Office of Education, Department of Health, Education, and Welfare.

Standardized Measurements Produce Compatible Components

by **Colonel W. J. Darmody, USA (Ret)**
The Sheffield Corporation, Dayton, Ohio

BUILDING a better guided missile or even a better mousetrap calls for a lot of careful measuring in this day and age. And the men who research and develop the new missiles or mousetraps have been the first to realize that precise, standardized measurement could save them a lot of headaches in the long run. They saw that the bent twig inevitably led to the bent tree—that imperfect measurement on early models resulted in imperfect or even unworkable products in commercial production. Dimensional discipline has long been recognized as necessary for successful production. But such discipline has not always been evident in some research and development areas.

Many measurements can be reduced ultimately to the three basic ones of length, mass, and time. Measurements of length are probably the most often used in specifying the design requirements or quality characteristics of many products. The keystone of any standards structure for length measurement, therefore, is tolerances or permissible variations in dimension.

The hazy and sometimes unpredictable path taken in development design is admittedly not the best atmosphere for realistic dimensioning and tolerancing practice. Concentration on performance objectives may sometimes override consideration of tolerances. To a development engineer, it seems only natural to view tolerances as a compromise with the perfection he desires in product performance. But such a viewpoint contradicts the reality of practical machining and measurement capabilities.

Precise measurements of test models or test lots can be an important element for relating performance characteristics in the testing stages. Realistic and practical tolerancing is an important part of establishing accuracy

objectives for just such measurements. Failure or success in tests can be analyzed accurately only in relation to the accuracy of measurement of the models or test lots. The reasons for success or failure may be lost when an accurate dimensional history is not established before testing. This loss can create an atmosphere of uncertainty in the evaluation stage.

Some of the standards available today might be likened to dictionaries for designers. A standard, such as American Standard Preferred Limits and Fits for Cylindrical Parts, B4.1-1955, affords development designers an opportunity to launch models or development lots into the test with practical tolerances. It offers guidance to preferred sizes which is helpful in attaining tool economy in the model shop. It can also lead to design features and sizes compatible with commercially available tooling. This will help cut down on the time required for manufacture of test models or lots.

Such standards also help to smooth the path from dream to reality—from development design to the shop.

In some instances, sketches with only fragmentary dimensional information may be the only data forwarded to the shops. Here, a standard such as B4.1-1955 can be an important aid to the shop. From it the shop can derive the tolerance information that should be a part of every dimension. The relation of tolerance to size, tolerance to machining capability, and tolerance to dimensional functions are all available in this standard. This information, of course, helps to reduce stalemates between development design and the shop—stalemates that result from drawings devoid of tolerances or with incomplete or impractical tolerances.

Extremely close tolerances pose another problem that only accurate standards can help to solve. Developments of today such as gyroscopes or liquid fuel injection components certainly strain the limits of human achievement in machining and measuring accuracy. The growing demand for closer and closer tolerances may also put a strain on relations between development design and the shop. Such strain really results from a lack of knowledge of measurement and machining capabilities,

This is one of 44 papers presented at the Eighth National Conference on Standards, San Francisco, California, November 13-15, 1957, and published in the Proceedings of the Conference, Standards, Key to Progress and Profits. Available from the American Standards Association, 70 East 45 Street, New York, \$4.00.

or possibly from a designer's distrust of proper dimensional discipline in the manufacturing area. American Standards, such as the B1 Series for threads and B4.1 for cylindrical fits, are fine textbooks for educating both designers and shopmen in the realities of tolerance.

Where "blindness" to the realities of tolerancing persists in the form of "no tolerance" demands to the shop, and the minimum tolerances of American Standard B4.1-1955 do not seem to satisfy precision requirements, tolerance standards of the gage industry are available for guidance. The following table shows four classes of tolerances for cylindrical gages.

NOMINAL SIZE IN. GAGEMAKERS' TOLERANCES CLASSES

Above	To and Including	XX	X	Y	Z
0.029	0.825	.00002	.00004	.00007	.00010
0.825	1.510	.00003	.00006	.00009	.00012
1.510	2.510	.00004	.00008	.00012	.00016
2.510	4.510	.00005	.00010	.00015	.00020
4.510	6.510	.000065	.00013	.00019	.00025
6.510	9.010	.00008	.00016	.00024	.00032
9.010	12.010	.00010	.00020	.00030	.00040

While these tolerances have proven practical in gage manufacture, their application to materials other than hardened steel, cemented carbides, or chrome plate may interpose some problems. In any event, they offer a useful guide to research and development for tolerance

information that is more precise than that in American Standard B4.1-1955. Industry standards such as these, however, should never be viewed as mandatory for specific applications. Function and performance are overriding design considerations. But practical tolerances will always pave the path to product success.

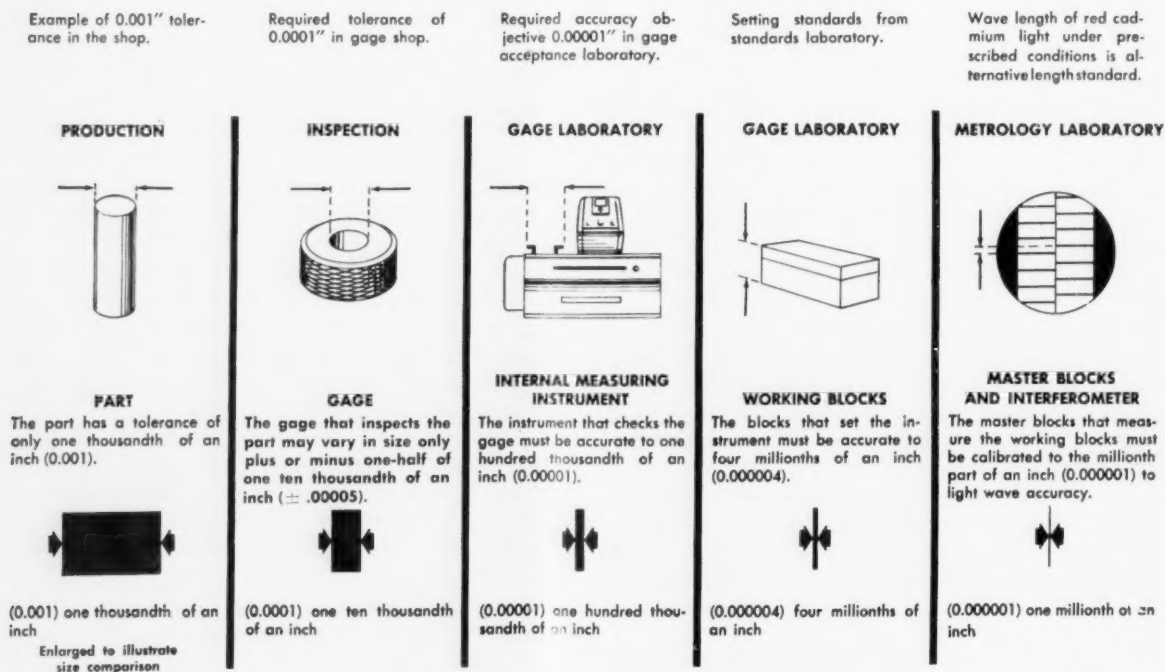
Determining Accuracy of Linear Measurement

After product development attains a satisfactory tolerance status, whether it be on the drawings or in the minds of men in the shop, standards concepts will probably shift from "paper" standards to the more exact physical standards. Such a physical standard is the National Standard of Length—the prototype meter bar in Washington, or its authorized equivalent, the wavelength of the red radiation of cadmium light under prescribed excitation conditions. Every precision measurement should be able to trace its ancestry to a National physical standard. The progressive steps toward greater precision for a system of dimensions is shown in Fig. 1. In model shops where accurate measuring instruments are used instead of fixed gages, there would be only four steps from model to light wave measurement.

This analysis of the steps to precision control is not a standard and has no mandatory implications. However, it does show the route which many companies are taking to insure that the inches in their products are certified, reliable inches. Inches, in other words, that

Fig. 1

THE PATH OF PRECISION FROM THE NATIONAL STANDARD OF LENGTH TO THE PART TOLERANCE IN THE SHOP



For ultra precise R & D parts or their dimensional analysis, a properly equipped metrology laboratory, with adequate environment can operate to limit effects of tolerance encroachment. This may increase costs after those that would be expected from shop gaging techniques.

Fig. 2

THE ACCURACY OF ANY MEASUREMENT DEPENDS UPON A NUMBER OF ELEMENTS IN ADDITION TO THE INHERENT ACCURACY FACTORS OF THE INSTRUMENT. THIS TABLE LISTS THE ELEMENTS AND CONSIDERATIONS THAT MIGHT BE APPLICABLE TO A VERY PRECISE MEASUREMENT SUCH AS DETERMINATION OF PITCH DIAMETER OF A SETTING PLUG MADE TO CLASS W TOLERANCES OF HANDBOOK H 23.

1. WORKPIECE	2. INSTRUMENT	3. STANDARD	4. ENVIRONMENT	5. HUMAN ELEMENT
(a) Clean and free from burrs. (b) Temperature equalization with instrument and standard. (c) Essential points of measurement. (d) Accuracy objective proportional to size. (e) Geometrical truth of supporting features. (f) Consistency of errors in related features such as pitch diameter to lead in threads. (g) Geometric truth, such as out of round, sufficient to assure repetitive readings within accuracy objective. (h) Deformations from support conditions. (i) Elastic indentation effects of measuring contacts. (j) Effects of thermal expansion between measuring temperature and standard 68° F. (k) "Hidden Geometry" such as lobing that will not be detected by contact conditions.	(a) Adequate amplification for accuracy objective. (b) Amplification checked under conditions of use. (c) Effects of friction, backlash, hysteresis, or zero drift. (d) Electrical, optical, or pneumatic input to amplifying system functioning within prescribed limits. (e) Contact geometry correct for both workpiece and standard. (f) Contact pressure control functioning within prescribed limits. (g) Contacts in correct geometrical relationship and inspected for wear or chipping. (h) Slides, ways, or moving elements not adversely affected by wear or damage. (i) Deformation effects in instrument when heavy workpieces measured. (j) Auxiliary elements such as wires, rolls, angles, plates, calibrated and checked for function. (k) Magnification of diameter error in thread wires when positioned in thread form.	(a) Precision proportional to accuracy objective of workpiece measurement. (b) Calibration by authoritative laboratory. (c) Application of calibration corrections. (d) Effects of wear, damage, burrs, or dimensional instability since last calibration. (e) Thermal expansion effects of materials. (f) Effect of modulus of elasticity on contact indentations. (g) Effects of flatness, parallelism, wear or warpage of gage blocks as they function in measuring contacts. (h) Long end standards supported at points to minimize deflection effects. (i) Effects of clamping force on gage blocks used with holders or attachments. (j) Effects of differing geometrical form between workpiece and standard as they function in measuring contacts.	(a) Standard measuring temperature is 68° F. (20° C.) (b) Temperature equalization between standard, workpiece and instrument. Deficiency of one degree in equalization could introduce error of 6.5 millionths per inch of size. (c) Thermal expansion effects from heat radiation from lights, heating components, sunlight, and humans. (d) Effects of cycles in temperature control. (e) Impinging drafts of air may introduce thermal expansion size errors. (f) Manual handling may introduce thermal expansion errors. Human temperature is 30° higher than standard measuring temperature. Could affect error in one inch of steel up to .0002". (g) Clean and minimum vibration surroundings enhance precision. (h) Adequate lighting.	(a) Training. (b) Skill. (c) Sense of precision appreciation. (d) Infallible, complacent or opinionated attitudes towards personal accuracy achievements. (e) Open-minded and competent attitudes towards personal accuracy achievements. (f) Planning measurement techniques for minimum costs consistent with precision requirements. (g) Appreciation of scope of accuracy evaluation which may be more or less than listed in columns 1, 2, 3, and 4. (h) Ability to select high quality measuring instrument standards with required geometrical and precision capabilities.

are precisely derived from our National Standard of Length.

Five basic elements determine the accuracy of linear measurement. They are: (1) the workpiece, (2) the measuring instrument, (3) the standard used to calibrate the measuring instrument, (4) the environment, and (5) the person making the measurement.

Some of today's research and development (R & D) measurements are so precise it is necessary to make them in an atmosphere so clean that even a surgeon would approve of it. Requirements for greater temperature control seem to be pushing hard on the actual limits of temperature measurement itself. In Fig. 2 there is a list of many of the other considerations involved in attaining required accuracy of measurement.

Modern Tools for Accurate Measurement

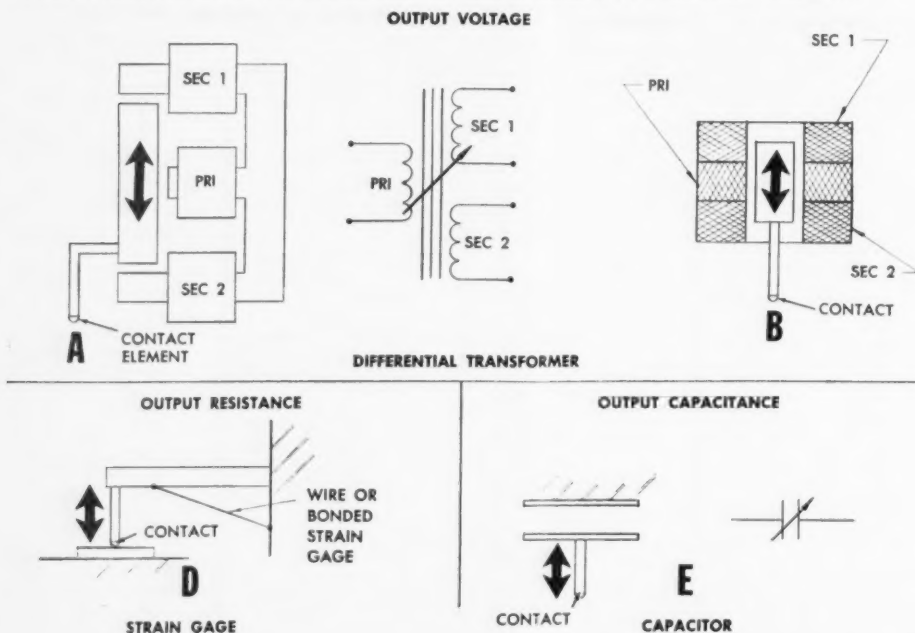
The increasing precision requirements of R & D work have greatly changed the instruments to be found in model or experimental shops. Gone are the days of the micrometer, vernier, or mechanical amplifying, measuring devices. Most of today's shops depend on modern electronic or pneumatic amplifying instruments.

But, for a time, a distinct gap existed between the accuracy capabilities of older hand measuring tools and the accuracy objectives of today's research and development. To bridge that gap many an R & D engineer has had to spend precious research time devising measuring instruments that meet his own accuracy requirements. Today, however, he need not divert himself from his prime research objective. The instruments he needs for the most precise measurement are ready at hand. The gap has been closed with sensitive, rugged, versatile, and production-proved measuring instruments, utilizing pneumatic or electronic amplifying means.

Some of the basic electrical circuitry available in commercial dimensional measuring devices is illustrated in Fig. 3. Desirable attributes of these devices include stability, freedom from zero drift, relative insensitivity to normal commercial circuit input voltage variations, freedom from human or object proximity effects, sensitivities as high as 100,000 to 1 for measuring displacement (one millionth of an inch equals 0.1 inch scale), low heat generation, freedom from mechanical or electrical hysteresis, and capability of wide application in

Fig. 3

SOME ELECTRICAL SENSING ELEMENTS FOR DIMENSIONAL MEASUREMENT. ELECTRICAL CHARACTERISTICS USED AS ANALOGUE OF DISPLACEMENT OF CONTACT ELEMENT.



measuring instruments and special experimental setups.

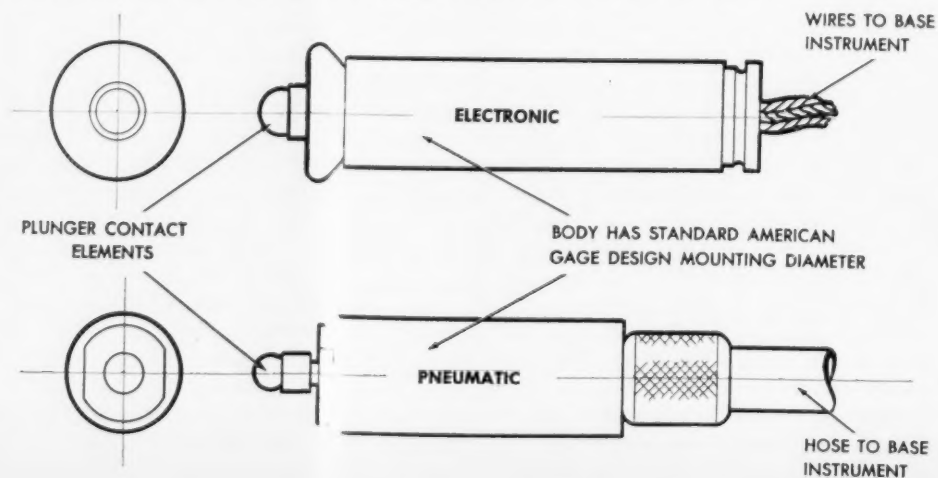
The differential transformer principle embodied in a precision cartridge type of sensing element as shown in Fig. 4 is a popular measuring system for R & D laboratories and shops. It has the standard mounting feature of American Gage Design Standard mechanical indicators. The contacting plunger is precisely mounted so that measurements in millionths of an inch can be achieved. Spindle side play is eliminated, and with it go the inductive effects created by displacement of the measuring contact. This system is used in comparators, external measuring machines, internal measuring ma-

chines, and height gages. It is also easy to apply to the many types of special measuring setup required in research and development. As an illustration, the sensing element can be mounted on a movable arm for determining precisely the form of spherical features. The base instrument for this system contains the indicating electrical meter and circuits for primary excitation and secondary amplification, as well as elements specially designed to assure linearity and stability.

Air gaging techniques provide a sound basic approach to many R & D measurement problems. Air gaging is generally recognized as the most precise and universal

Fig. 4

CARTRIDGE TYPE SENSING ELEMENTS FOR ELECTRONIC AND PNEUMATIC GAGING SYSTEMS.



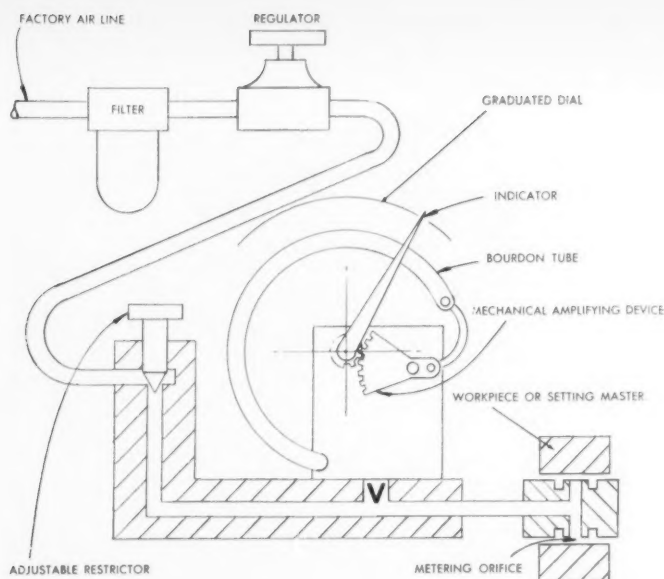


Fig. 5

BACK PRESSURE TYPE OF AIR GAGE CIRCUIT. PRESSURE VARIATION IN VOLUME V IS ANALOGUE OF DIMENSIONAL VARIATION IN WORKPIECE AS FEATURE MEASURED IS PART OF GAGING ORIFICES.

means for internal measurements. Fig. 5 illustrates air gage circuitry of the back pressure type. Some variations of this circuit may include a venturi element, or the circuit may be divided for differential operation. The widely used flow type of air gage circuit is illustrated in Fig. 6.

In the past, the "open jet" type of size-sensing element (such as the internal spindles illustrated in Figs. 5 and 6) has had limited application in R & D work because it could function only to individual dimensions and tolerances. New and highly adaptable cartridge

type, displacement-sensing elements for pneumatic gages are now available. Some of these gage elements are illustrated in Fig. 4.

In addition, a complete family of adjustable air-gage measuring instruments (Figs. 7 and 8) has been developed for universal types of application in R & D work. These are capable of setting to gage blocks and attachments. They include adjustable spindle kits, adjustable bore gages for internal measurements, friction- and hysteresis-free test indicators, and adjustable air snap gages for external measurements.

Pneumatic cartridge type sensing elements can be clamped in multiple position arrangements. Size variations are thus indicated on multicolumn flow gage base instruments for side-by-side viewing. This type of setup can be used for measurements of machining experimental stress analysis or in special experimental setups.

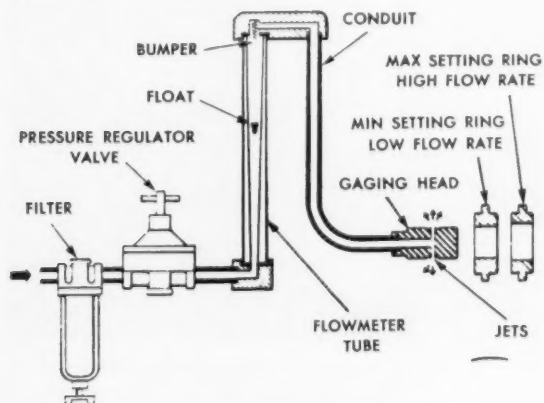
Pneumatic techniques are also very well adapted to high precision measurements of squareness, bend, twist, center distance, etc. The newer and more universal adjustable techniques of pneumatic gaging have been an important contribution to better measurements in research and development.

It is perhaps unfortunate that, until recently, measuring equipment and techniques have not been subject to much formal standardization themselves. Accurate measurements are generally a necessary part of most standards. Recent developments in electronic and pneumatic gaging have provided the means for just such precise and accurate measurement.

With standard measures and measuring techniques to guide them, research and development engineers can meet the increasing demands for ever greater precision performance. Tomorrow's products, being more intricate and precise than ever, will run only if they have been based on standard measures referred to at each stage of development.

Fig. 6

FLOW TYPE OF AIR GAGE CIRCUIT. VERTICAL AND PARALLEL PRESENTATION OF OUTPUT DATA ENABLES FAST SIDE-BY-SIDE PANORAMA VIEWING. MULTIPLE FEATURES ENABLE DIMENSIONAL ANALYSIS OF POSITION AND FORM DIMENSIONS AS WELL AS THE LIMITING TYPE.



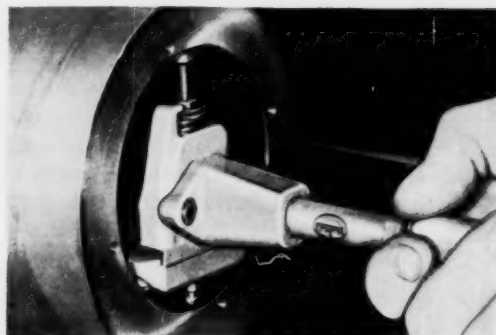
Spindle and setting masters are shown for measurement of internal cylindrical feature.

Fig. 7

ADJUSTABLE TYPES OF AIR GAGING ELEMENTS USEFUL FOR PRECISE R & D MEASUREMENTS



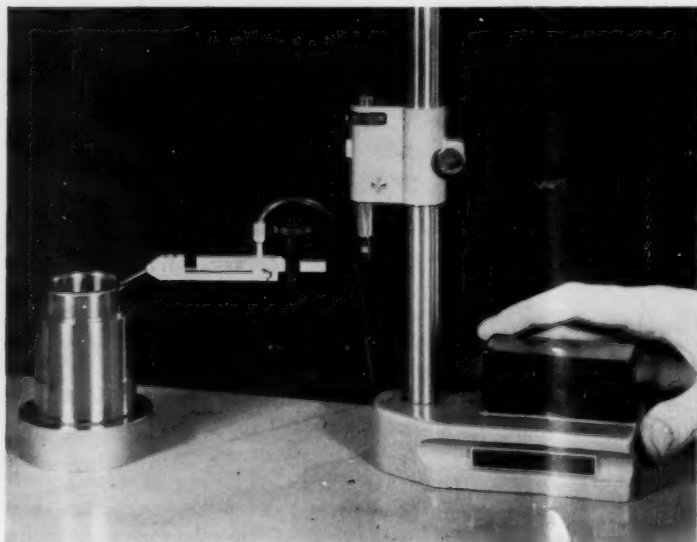
Adjustable spindle kit with set of gage blocks enables measurement of any hole from 1" to 3" to accuracy as fine as 0.00001"



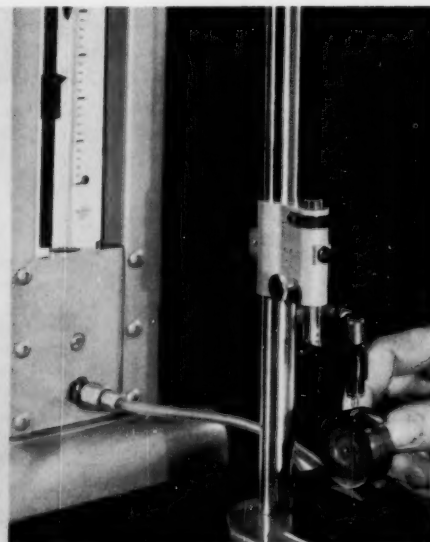
Adjustable bore gage with gage blocks enables very precise measurement of holes from 3" to 12"

Fig. 8

GENERAL PURPOSE APPLICATIONS OF AIR GAGING FOR PRECISE EXTERNAL TYPE OF R & D MEASUREMENT



Test indicator (air) with height gage and surface plate set up for measuring parallelism of ends of part. The contact could be zeroed on stack of gage blocks and length of part could then be measured by comparison.



Cartridge type air gaging element used for roundness and size measurement of cylindrical part. Sensing element would be zeroed on stack of gage blocks for the size comparison.



(Photo, U. S. Rubber Co.)

Standard methods of sampling and testing latex are among proposals being considered by ISO/TC 46. Here, latex is being gathered on U. S. Rubber Company plantations in Malaya. The most productive trees yield 20 to 25 pounds of rubber a year.

International Work on Rubber

As reported by **Dr Robert D. Stiehler**

ISO Technical Committee 45 on Rubber has decided to hold its eighth meeting in New York the week of October 26-31, 1959. This decision was made at the seventh meeting of the committee held in Zurich, Switzerland, September 30 through October 5, 1957.

Seventy-five delegates representing 14 countries were in attendance at the Zurich meeting. J. M. Buist of the United Kingdom served as chairman. The Secretariat for ISO/TC 45 is held by the British Standards Institution.

The United States was represented by a delegation of 11 members under the leadership of Dr Robert

Stiehler of the National Bureau of Standards. The American delegation was organized by the American Group for ISO/TC 45. This American Group, which holds the responsibility for all U. S. technical participation in TC 45, was organized by Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials upon ASA's assignment of responsibility for the American membership to ASTM.

An important action taken at the meeting was establishment of liaison between Technical Committee 45 and ISO/TC 61 on Plastics. Dr J. R. Scott, United Kingdom; R. Ecker, Germany; and Dr Stiehler, USA, were named as a liaison group to represent Technical

Committee 45 at meetings of TC 61. The plastics committee was represented at the Zurich meeting by R. L. Delatire, France; Professor A. Meliochia, Italy; and Professor R. Nitsche, Germany.

A number of recommendations were approved by the committee for circulation as ISO proposals. Among these were recommendations on low temperature tests; on electrically conductive rubber; and on a number of problems concerning raw rubber, including sampling, dirt, volatile matter, ash, rubber hydrocarbon, copper, manganese, Mooney viscosity, and viscometer cuic characteristics. Others to be circulated as ISO proposals include rubber-to-metal bonding; volatile fatty acids, and the Delft specimen for tear strength.

Work is going forward on preparation of equivalent terms in several languages and their definitions.

Since the 1957 Fall meeting, ISO has reported that five ISO Recommendations have now been completed and published. These are:

ISO R33 — Du Pont constant load method of measuring abrasion resistance

ISO R34 — Tear strength of vulcanized natural and synthetic rubbers

ISO R35 — Mechanical stability of latex

ISO R36 — Adhesion of vulcanized natural or synthetic rubbers to textile fabrics

ISO R37 — Tensile strength of vulcanized natural and synthetic rubbers

A sixth is in the hands of the printers. This is ISO Recommendation 48 on Hardness.

Five draft ISO Recommendations have already been

circulated to member-bodies of ISO by the General Secretariat and comments received have been reviewed. It is expected these will be ready for vote by the ISO Council soon.

No. 144 — Sampling of latex

No. 145 — Determination of total solids of latex

No. 146 — Determination of alkalinity of latex

No. 147 — Determination of dry rubber content of latex

No. 148 — Determination of KOH number of latex

Three others have been circulated to the member-bodies but no comments have been received:

No. 171 — Accelerated aging or simulated service tests on vulcanized natural or synthetic rubber

No. 172 — Determination of resistance to flex cracking of vulcanized natural and synthetic rubber (De Mattia machine)

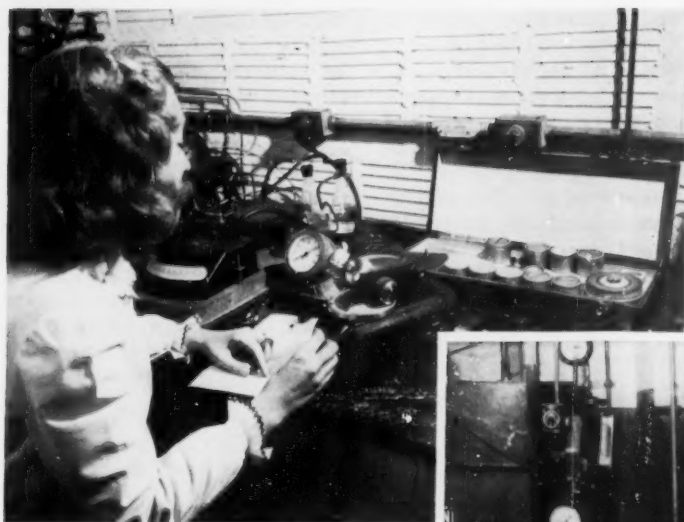
No. 173 — Determination of resistance to crack growth of vulcanized natural and synthetic rubber

In line with action taken at the meeting, the secretariat will now prepare draft proposals on compression set, classification of vulcanized rubber, ozone aging, latex density, and on a microhardness tester which would give results in international rubber hardness degrees.

Further work is to be done on small specimens, and interlaboratory tests are to be conducted on hardness and compression set at low temperatures, and on mixing, vulcanizing, and testing procedures for natural rubber.

This man is placing a coating of synthetic rubber on fabric. ISO Recommendation 36 provides tests for adhesion of vulcanized natural or synthetic rubber to textile fabrics.





One method of checking abrasion resistance of synthetic rubber-coated fabrics.

Photos—Standard Oil Co. (N.J.)



Here, samples are being measured before the rubber is vulcanized.

For future work to be discussed at the eighth meeting, the committee agreed to extend the methods under consideration to include synthetic rubbers if they are not included at present. The members also agreed that dynamic tests would be taken up at the 1959 meeting, and that specifications for rubber products will be discussed.

The national standards bodies of the following countries were represented at the Zurich meeting: Brazil, Czechoslovakia, France, Germany, Hungary, India, Italy, Netherlands, Poland, Sweden, Switzerland, United Kingdom, USA, USSR.

For testing purposes, a batch of rubber and chemicals is blended on a miniature mill in rubber testing laboratory.

(U. S. Rubber Co.)



USA Delegation at Zurich

Dr. Robert D. Stiehler, National Bureau of Standards,
head of delegation
G. H. Barnes, Goodyear Tire and Rubber Company
G. H. Bimmerman, E. I. du Pont de Nemours & Co, Inc.
S. R. Doner, Raybestos-Manhattan, Inc.
B. S. Garvey, Jr., Pennsylvania Salt Manufacturing Co.
R. S. Havenhill, St Joseph Lead Co.
Irving Kahn, Department of the Army
J. F. Kerscher, Goodyear Tire and Rubber Company
Harry LeBovitz, General Services Administration
G. C. Maassen, R. T. Vanderbilt Co.
J. C. Monterroso, Department of the Army

WHAT IS YOUR QUESTION?

How do the electronic standardization programs of the free countries of Europe compare with ours? Are they freely supporting the international program?

The free countries of Europe and all over the world are not only supporting the international program for electronic apparatus and component standardization being carried on through the International Electrotechnical Commission, but they are vigorously participating in all phases of this activity and requesting more of it. This is exemplified by the attendance at the meetings of IEC Technical Committee 40 and its subcommittees covering electronic components and testing, which were held in Zurich, Switzerland, October 1 to 12, 1957. The delegate attendance was approximately 218 men on electronic subjects alone, with some 20 countries participating. This is greater attendance than participation in the entire world standardization program of IEC on electronic and electrical subjects in 1950.

Comparison of the electronic standardization programs of other countries with that in the United States is difficult because not all of the countries have voluntary standardization activities such as are carried on in the United States by our engineering societies and trade associations through the American Standards Association. However, many free countries in Europe have programs directly comparable to ours, some of them at an even more advanced level from a technical standpoint, and most of them being carried on at a very rapid pace fully parallel with U.S. technology. Such nations as England, Holland, Germany, India, and Italy have very active standards organizations.

In the technical committees of the International Electrotechnical Commission, where the nations meet to discuss electronic standardization, there is a very advanced level of sophistication from a technical stand-

point and a remarkable degree of friendly cooperation based on technical facts in the attempt to develop truly representative and useful world standards in the electronics field. The spirit of cooperation and contribution exhibited by all of the participants is enviable in comparison to other international efforts in the political and economic fields.

—Reply by Leon Podolsky, Technical Assistant to the President, Sprague Electric Company, to question asked at National Conference on Standards, San Francisco, California, November 13-15, 1957.

Do you think burial of radioactive waste a good long-time plan anywhere above sea level? If the steel drums are shielded to comply with shipping regulations, why cannot they stand in a field? Why put them in the ocean where they are beyond control?

I feel that burial above sea level is a good plan as long as the burial site is controlled and that there is no possibility of contaminating water supplies. I do not feel that allowing steel drums to stand in a field is a good long-time plan since steel drums will, in time, disintegrate and release their contents, and possibly contaminate ground water supplies. The advantage of ocean disposal (for limited quantities of waste) is that they will be inaccessible to all normal human activities.

—Reply by A. L. Smith, Head, Radiological Safety Branch, U.S. Naval Radiological Defense Laboratory, San Francisco, to question asked at National Conference on Standards, San Francisco, California, November 13-15, 1957.

What is the recognized national standard symbol for transistors? Is it called out on a parts list as TR, T, Q, V, or what?

MIL-STD-16B and the Institute of Radio Engineers Standard 57 IRE 21.S2 both give Q as the reference designation for transistors. A proposed American Standard that is consistent with both the IRE and MIL documents is now being processed.

—Reply by H. P. Westman to question asked at National Conference on Standards, November 13-15, San Francisco, California.

Are copies of the RCA (Radio Corporation of America) Corporate Drafting Manual available to persons other than those employed by RCA?

Copies of the RCA manual are restricted to RCA employees and

functions throughout the world. The distribution now serves about 2000 locations and constitutes a sizable printing and mailing burden. The manual closely follows the standard drafting practices approved by the American Standards Association and prepared by the Y14 committee. This committee has some 16 sections on its agenda, of which five have been completed and issued in final form. The five issued sections go far toward filling requirements at the company level and greatly facilitate the task of preparing and maintaining a proprietary company manual.

—Reply by S. H. Watson, Manager, Corporate Standardizing Division, RCA, to question asked at National Conference on Standards, San Francisco, California, November 13-15, 1957.

What is the name of the bureau or office being set up for the coordinating of standards and specifications? Where is it located?

The Standardization Division, Office of Production Policy, Office of the Assistant Secretary of Defense (Supply and Logistics), The Pentagon, Washington 25, D. C., is charged with the responsibility for establishing a program of coordination of specifications and standards. For the various individual specifications and standards involved in such a program, coordination may be carried out by any one of the military services, bureaus, or other activities designated by the military departments. In this latter case, since coordination with the industry is one of the requirements for processing these documents, the location of specific activities for a given document should be disclosed during the coordination process. For all specifications the Military Index of Specifications and Standards, Volumes II, III, and IV will reveal the activities involved. (Available through the Superintendent of Documents, Washington 25, D. C.)

—Reply by J. J. Dunn to question asked at the National Conference on Standards.

*Plan to Attend
Company Member Conference
Spring Meeting
Detroit, Michigan
April 29, 30*

FROM OTHER COUNTRIES

Members of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Orders may also be sent to the country of origin through the ASA office. Titles are given here in English, but documents are in the language of the country from which they were received. An asterisk * indicates that the standard is available in English as well. For the convenience of readers, the standards are listed under their general UDC classifications. In ordering copies of standards, please refer to the number following the title.

677 TEXTILE AND CORDAGE INDUSTRY

United Kingdom (BSI)

- Resistance of fabrics to penetration by water (hydrostatic head test) BS 2823:1957
- The removal of added matter from textiles BS 2825:1957
- Cop bases for re-wound solid cops BS 2828:1957
- Analysis of woven fabric construction BS 2861-66:1957
- Curl in textile fabrics BS 2888:1957
- Test code for trash content of cotton and waste by the Shirley analyzer BS 2889:1957
- Cotton belting ducks BS 1069:1957
- Cotton fabrics for the reinforcement of rubber hose BS 1103:1957
- Measurement of carotting of hatters' fur BS 2933:1958
- Flat driving chains for carding engines BS 2934:1957
- Description of woven and warp-knitted fabrics containing man-made fibres BS 2935:1957
- Saw tooth wire for carding engines BS 2936:1957

USSR

- Silk netting for sieves GOST 4403-57
- Rules for packing and marking drygood bolts GOST 7000-56
- Mercerization of cotton fabrics and yarn GOST 8205-56
- Canvas for cross-stitch embroidery GOST 8206-56
- Fabrics of mixed rayon and cotton fibres GOST 8209-56
- Poplin, taffeta and other similar fabrics GOST 8219-56
- Test for resistance to wrinkling, etc. GOST 3814-56
- Pure wool cheviot and knitted wares GOST 6911-56
- Pure wool fabrics for overcoats GOST 6069-56
- Silk lining GOST 4772-56
- Silk fabrics for wearing apparels GOST 5067-56
- Pure woollen fabrics for wearing apparels GOST 8243-56
- Knitted fabric, tricot GOST 8265-56

678 MACROMOLECULAR MATERIALS

Belgium (IBN)

- Mechanical stability of Latex NBN 430
- Traction test of Latex NBN 431
- Hardness test of Latex NBN 432
- Acetonic extract of phenolic mouldings NBN 450
- Apparent density of moulding materials NBN 451
- Water absorption NBN 452
- Deflection temperature under load NBN 453

Roumania (CSS)

- Rubber hoses for petroleum industry STAS 4614-55

Union of South Africa (SABS)

- Polyvinyl chloride containers for reference books SABS 531-1956

- Rubber hose for low and medium pressures AR 17-56
(Recommended Simplified Practice)

United Kingdom (BSI)

- Methods of testing vulcanized rubber. Determination of hardness BS 903:Part A7:1957
- Low density polythene rod BS 2919:1957
- Methods of testing vulcanized rubber. Determination of electric strength of insulating soft vulcanized rubber and ebonite BS 903:Part C4:1957
- Determination of cross-breaking strength of ebonite BS 903:Part D4:1957
- Methods of testing cellulose acetate flake BS 2880:1957
- Methods of testing vulcanized rubber. Determination of crushing strength of ebonite BS 903:Part D5:1957
- Determination of tensile strength of ebonite BS 903:Part D5:1957
- Loaded and unloaded ebonite for electrical purposes BS 234:1957
- Methods of testing vulcanized rubber. Methods of testing rubber proofed fabric BS 903:Parts G1 to G9:1957
- Determination of tensile strength of properties BS 2782:Part 3:1957
- Methods of testing vulcanized rubber. Determination of compression set BS 903:Part A6:1957
- Aminoplastic mouldings BS 2906:1957
- Phenolic mouldings BS 2907:1957

678.5 PLASTICS

France (AFNOR)

- Determination of polystyrene substances soluble in methanol NF T 51-006
- Determination of free ammoniac and ammoniac components in phenoplast mouldings NF T 51-009
- Determination of free phenol in phenoplast mouldings NF T 51-010
- Test for absorption of boiling water by plastics NF T 51-011

Germany (DNA)

- Artificial leather, determination of weight per unit area DIN 53352
- 4 stds for plastics, different types of moulds DIN 7708
- 2 stds for synthetic leather, testing of DIN 53358, -82
- Molding technics, working method and means DIN 16700

Spain (IRATRA)

- Determination of permanent effect of heat on plastics UNE 53089
- Ash content in plastics UNE 53090
- Tension testing of vulcanized rubber UNE 53510
- Determination of apparent density of molding power UNE 53015
- Measurement of surface gloss of plastics UNE 53036
- Determination of resistance of laminated plastics to chemical reagents UNE 53043
- Determination of acidity of plasticizers UNE 53045
- Saponification number test of plasticizers UNE 53046

- Determination of transparency index of plasticizers UNE 53047
- Determination of resistance to high temperature of chlorinated plastics UNE 53048
- Components of polystyrene moldings, specifications of UNE 53049
- Determination of average thickness of laminated vinyl plastics UNE 53061
- Measurement of changes in linear dimension of nonrigid laminated thermoplastics UNE 53062
- Laminated vinyl plastics for general use, specifications of UNE 53071
- Determination of temperature of deflection under load UNE 53075
- Determination of acetone soluble matters of phenolic moldings UNE 53081
- Surface resistance of insulating plastics at high voltage and low current UNE 53082
- Dielectrical resistance of insulating liquids UNE 53084
- Determination of ammonia in phenol-formaldehyde moldings UNE 53088

681.2 INSTRUMENT MAKING

Austria (ONA)

- Scale ranges of manometer, vacuummeter, and mano-vacuummeter ONORM M 5832

Germany (DNA)

- Ring and plug gages DIN 2259
- Platform scales up to 1000 kg DIN 1926
- SI 198

- Different forms of scale fulcrum DIN 1921

- 2 stds for different caliper gages (nominal dimensions from 3 to 100 mm) DIN 2232/3

Japan (JISC)

- Rockwell hardness tester JIS B 7726
- Outside and inside calipers JIS B 4607/8
- 2 stds for levels JIS B 7901-54, 7905-55*
- Theodolite JIS B 7902-55*
- Pocket Compass JIS B 7903-55*
- Alidade JIS B 7906-55*
- Tripod connections for optical surveying instruments JIS B 7907-55*
- Glass thermometers for testing petroleum products JIS B 7410
- Pressure gage JIS B 7505

Poland (PKN)

- Low pressure gas meters PN M-54823

Roumania (CSS)

- Vernier calipers STAS 1373-55
- Micrometer calipers STAS 1374-55

USSR

- Pressure and vacuum recording instruments GOST 7919-56
- Straight edge GOST 8026-56
- Metal rulers, millimeter graduated GOST 427-56

687 CLOTHING INDUSTRY. SEWING MACHINES, ETC

Germany (DNA)

- Needles for industrial speed-sewing machines, systems 1738A, 1738, 1647 DIN 5326

NEW BOOKS . . .

HEATING VENTILATING AIR CONDITIONING GUIDE, 1958. Thirty-sixth edition. 6 x 9. Cloth Bound. Technical Data Section 1272 pp. Catalog Data Section 503 pp. American Society of Heating and Air Conditioning Engineers, 62 Worth Street, New York 13, N. Y. \$12.00. This new edition offers extensive additions and revisions in the Guide's Technical Data Section. These include addition of both a description and a design method for high velocity air duct systems, an enlarged section on the heat pump, new information on exhaust hood performance and design for hot and cold processes, and a simplified presentation of industrial drying principles, calculations, and system design. They also include additional data on heavy fuel oils and their use, with pre-heating, in automatic fuel burning equipment, and new data on heat gain through glass block used in skylights. Requirements for shading glass, and basic principles involved in calculating heat flow through glass areas are also included in the new material. A general revision of the chapter on radiators, convectors, baseboard, and finned-tube units, and addition of new data on their ratings and performance are features of this new edition. There is also a revision of ranges of capacity for electrical heating units and inclusion of a method of determining operating cost for these units, the section on performance and testing of air cleaners has been enlarged and the list of allowable concentrations of air contaminants has been extended. Also included are additional codes and standards of interest to users of the Guide.

STANDARD INDUSTRIAL CLASSIFICATION MANUAL, 1957. 433 pp. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. \$2.50. Prepared by the Technical Committee on Industrial Classification under the sponsorship of the Office of Statistical Standards, Bureau of the Budget, this publication offers a method of classifying establishments by the type of activity in which they are engaged. It is intended to aid in collecting, tabulating, and analyzing data. The Classification covers the entire field of economic activities. This is a revision of the 1945 edition of the Classification of Manufacturing Industries and the 1949 edition of Nonmanufacturing Industries.

INTERNATIONAL ELECTROTECHNICAL VOCABULARY. Group 20, Scientific and Industrial Measuring Instruments. IEC Publication 50 (20). Second edition. 1958. International Electrotechnical Commission, 1, rue de Varembe, Geneva, Switzerland. (Copies available from American Standards Association, 70 E. 45 Street, New York 17, N. Y. \$3.60. This is the ninth of 22 groups which will form the second edition of the International Electrotechnical Vocabulary. The terms with definitions are given in French and English; the terms alone in six lan-

guages, German, Spanish, Italian, Dutch, Polish, and Swedish. The USSR National Committee of the IEC has been entrusted with preparation and publication of the vocabulary in the Russian language.

The terms defined in this publication (Group 20) are under the section headings: General terms; detecting instruments; measuring instruments; special recording instruments; integrating instruments; measuring devices and accessory apparatus; constructional elements; characteristic terms; instrument transformers.

The National Committees of 16 countries voted explicitly in favor of this publication: Argentina, Austria, Belgium, Denmark, France, Germany, India, Italy, Japan, Netherlands, Poland, Sweden, Switzerland, Union of South Africa, United Kingdom, USA.

DETERMINATION OF HARDNESS OF VULCANIZED NATURAL AND SYNTHETIC RUBBERS. ISO Recommendation R48. First Edition. July 1957. International Organization for Standardization, 1, rue de Varembe, Geneva, Switzerland. (Copies available from the American Standards Association, 70 E. 45 Street, New York 17, N. Y.) \$0.80. This standard hardness test is based on measurement of the penetration of a rigid ball into the rubber test piece under specified conditions. The measured penetration is converted into International Rubber Hardness Degrees.

Prepared by ISO Technical Committee 45 on Rubber, with the British Standards Institution serving as secretariat, the formula as published represents a revision of an earlier draft modified in line with comments presented by the USA member-body. The American Standards Association, representing the USA, was one of the 26 ISO member-bodies which approved the draft.

IEC SPECIFICATION FOR GLASS INSULATORS FOR OVERHEAD LINES WITH A NOMINAL VOLTAGE OF 1000 VOLTS AND UPWARDS. IEC Publication 87. First edition. 1957. International Electrotechnical Commission, 1 rue de Varembe, Geneva, Switzerland. \$3.00. This publication applies to insulators of glass for overhead electric lines with a nominal voltage of 1000 volts and above.

The six chapters of the publication offer general specifications; definitions used in the specification; general rules for impulse tests; and classification of tests. Three of these chapters are devoted to various groups of tests—Group I on impulse flashover test; dry one-minute power-frequency test; wet one-minute power-frequency test. These tests are intended to verify characteristics of the insulator which depend only on the shape and size of the insulator and of its accessories. Group II is on verification of dimensions; temperature cycle test; 24-hour mechanical test; short-time electro-mechanical breaking load test; mechanical breaking load test; puncture test; thermal shock test; galvanizing test; retest procedure. These tests are for the purpose of verifying the other characteristics of the in-

sulator and the quality of the materials used. Group III is on visual examination; mechanical test; power-frequency test. Purpose of these tests is the elimination of insulators with manufacturing defects.

There are two appendices which deal with humidity correction factors for flash-over voltages and with the method of producing artificial rain and verifying its characteristics.

A curve of correction factors for impulse and power-frequency flash-over voltages is included.

IEC Publication 75 provides the same type of information for porcelain insulators.

RECOMMENDATIONS FOR LEAD-ACID STARTER BATTERIES. IEC Publication 95. First edition. 1957. International Electrotechnical Commission 1 rue de Varembe, Geneva, Switzerland. \$2.40. These recommendations, intended to bring about greater international uniformity and understanding, specify the characteristics and acceptance tests for lead-acid accumulator batteries with a rated voltage of 6 or 12 volts. They apply to batteries used primarily as a source of starting and ignition current for internal combustion engines and also for the auxiliary installations of internal combustion engine vehicles. However, they do not apply to batteries for other purposes, such as the starting of railcar internal combustion engines or the lighting of omnibuses.

The publication deals with the composition and the specific gravity of the electrolyte, characteristics such as rated capacity, rapid discharge rate capacity at normal and low temperature, and the life of a battery.

The test methods recommended include the acceptance test procedure, specifying the checking of dimensions, weight and markings, specific gravity of the electrolyte and the rated capacity, as well as checking the rapid discharge rate capacity at low and normal temperature. There are also recommendations for the marking of batteries and measuring instruments. An appendix provides the definition of a fully charged battery.

Prepared by IEC Technical Committee 21, Accumulators, the recommendations were approved by the national committees of Belgium, Czechoslovakia, Denmark, Finland, France, Israel, Italy, Netherlands, Sweden, and the United Kingdom. The U. S. National Committee, however, explained that in the United States a specification published by the Society of Automotive Engineers is in general use and is quite satisfactory. The IEC recommendations and the SAE specification do not differ too widely in end result.

RECOMMENDATIONS FOR MAGNETIC TAPE RECORDING AND REPRODUCING SYSTEMS: DIMENSIONS AND CHARACTERISTICS. IEC Publication 94. First edition. 1957. International Electrotechnical Commission, 1 rue de Varembe, Geneva, Switzerland. \$2.40. This document gives dimensional and other characteristics necessary to secure interchangeability of recordings.

It applies to non-perforated magnetic tape and equipment used for sound recordings and sound reproduction in both professional and domestic applications. Those recommendations having to do with professional applications are in conformity with Recommendations No. 135 of the CCIR (London, 1953) and No. 209 (Warsaw, 1956), except where otherwise stated.

The recommendations lay down the mechanical and electrical requirements of recordings and sound reproducing equipment, specifying the nominal tape speed and tolerance, position of the active surface of the tape, position and dimensions of the magnetic sound track, spools, European type hub, NARTB type hub and flanges, adaptor to permit the European type machine fittings to receive the NARTB type hub, cine type spools, recording and reproducing characteristics, and standard replay chain. The dimensions, minimum tensile strength, flammability, and identification of tape sides of magnetic tape are specified, as well as tape leaders, program identification, start of programs, and identification by the leader and label on recorded tapes. An appendix gives the methods of measuring the magnetization of a tape.

The recommendations are illustrated by eight figures, of which four refer to spool dimensions.

METHODS FOR EMISSION SPECTRO-CHEMICAL ANALYSIS. 1957. 490 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. \$7.00. Sponsored by ASTM Committee E-2, this compilation contains all spectrochemical practices and methods published by ASTM. Also included are excerpts from ASTM methods or practices that are of direct interest to people making use of emission spectroscopy. Most of the recommended practices and methods pertaining to the spectrochemical analysis of metals are also included in the 1956 Book of ASTM Methods for Chemical Analysis of Metals.

This compilation presents pertinent information for each method and practice to permit its application in various laboratories and with different types of equipment. The scope, limitations, precision, and accuracy of the methods have been recorded to the extent of data available, in order that methods can better be compared and evaluated with respect to other analytical methods.

The book's four major sections cover general practices, nomenclature, spectrochemical analysis of metals, and spectrochemical analysis of nonmetals.

ASTM STANDARDS ON ELECTRICAL INSULATING MATERIALS. September, 1957. 692 pp. 6 x 9. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. \$6.00 The increased use of electrical power, creating a demand for new and better insulating materials, is reflected in this 1957 edition. It contains extensive revisions and new standards and provides an up-to-date compilation of ASTM test procedures and specifications for electrical insulation.

The publication contains 35 standard

methods, 32 tentative methods, and 17 specifications, including a suggested liquid displacement method for dielectric constant and dissipation factor of polyethylene.

1957 SUPPLEMENTS TO BOOK OF ASTM STANDARDS. In 7 parts. Heavy paper cover. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. \$4.00 per part. \$28.00 per set. These 1957 Supplements, issued in seven parts, give in their latest form 415 specifications, tests, and definitions approved by the American Society for Testing Materials. The standards included either were issued for the first time in 1957 or have been revised since their appearance in the 1955 Book of ASTM Standards or the 1956 Supplements. The following subjects are covered:

Ferrous Metals (Part 1; 520 pp.; 80 standards)
Non-Ferrous Metals (Part 2; 380 pp.; 56 standards)
Cement, Concrete, Ceramics, Thermal Insulation, Road Materials, Waterproofing (Part 3; 360 pp.; 60 standards)
Paint, Naval Stores, Wood, Cellulose, Wax Polishes, Sandwich and Building Constructions, Fire Tests (Part 4; 218 pp.; 33 standards)
Fuels, Petroleum, Aromatic Hydrocarbons, Engine Antifreeze (Part 5; 340 pp.; 76 standards)
Rubber, Plastics, Electrical Insulation (Part 6; 423 pp.; 70 standards)
Textiles, Soap, Water, Paper, Adhesives, Shipping Containers (Part 7; 280 pp.; 40 standards)

Your Nominations Are Invited

*for the
Howard Coonley Medal*



*for the
Standards Medal*

YOU are invited to send to the American Standards Association your nominations for the 1958 recipients of the Howard Coonley Medal and the Standards Medal. Nominations should be in the hands of the Managing Director of the Association before June 30, 1958.

The Howard Coonley Medal is awarded each year to an executive who has rendered a great service in advancing the national economy through voluntary standardization. Recipients have been The Honorable Herbert Hoover, Howard Coonley, William Batt, Senator Ralph E. Flanders, Thomas D. Jolly, Dr Harold S. Osborne, Frederick S. Blackall, Jr, and Roger E. Gay.

The Standards Medal is awarded to an individual who has shown leadership in the development and application of voluntary standards. It has been awarded to such well-known leaders in standardization as Frank O. Hoagland, Perry L. Houser, the late Dr P. G. Agnew, Dr John Gaillard, James G. Morrow, the late Charles Rufus Harte, and John R. Townsend.

Nominations should be submitted in quadruplicate on plain paper without indication as to the source of the nomination. Each nomination should be accompanied by a letter of transmittal.

In order to provide complete and comparable data, forms can be obtained from ASA for filing nominations.

news briefs



Cyril Ainsworth (center) receives Standards Engineers Society Fellowship certificate from Dr John Gaillard, SES Awards Committee chairman (right). SES President Herbert G. Arlt (left) presided.

- Cyril Ainsworth, deputy managing director of the American Standards Association, has been named a Fellow of the Standards Engineers Society. The Fellowship certificate was presented at a meeting of the Society in New York, January 15, 1958. Dr John Gaillard, management counsel, Fellow of the SES and chairman of the Awards Committee, presented the certificate. Dr Gaillard was in charge of mechanical engineering standards with the American Standards Association for many years.

As pointed out in the Fellowship citation, Mr Ainsworth has been a major contributor to the safety code program of the ASA and related activities. He has advised and assisted numerous interested groups toward the development of American Standards in a large variety of fields. In international standardization work he has been active in ABC unification, in projects initiated under the procedure of the International Organization for Standardization (ISO), and as an official U.S. representative in the safety code work of the International Labor Office. Unofficially, through visits all over the world, he has spread the philosophy of standardization developed by ASA, thus furthering international cooperation and good will.

- Agreements by delegates from 17 countries have resulted in recommended standard dimensions for electric motors with which USA representatives are well pleased. This was reported by M. S. Hancock, assistant manager of motor engineering, Westinghouse Electric Corporation. Mr Hancock was a delegate representing the U.S. National Committee of the International Electrotechnical Commission at a meeting of IEC Subcommittee 2B, Dimensions of Motors, at Stockholm, Sweden, November 13-15, 1957.

Seventeen countries were represented at the meeting, with three people representing two "inch" countries, and 33 representing 15 "metric" countries.

Effective compromises reached at the meeting provide that NEMA motors will be accepted as standard, Mr Hancock reports.

Object of the work of Subcommittee 2B is to permit international interchangeability of motors regardless of where they may have been made. The prime objective of the USA delegates was to have the NEMA standards (which are the basis of the C50 American Standards) adopted as the international standards. However, opposition by delegates of other countries made it impossible to attain this primary

objective. Therefore, the USA delegates concentrated on their secondary objective. This was to have the standards so written that NEMA motors will be accepted as standard and to have any other standards developed be as close to NEMA standards as possible. In this secondary objective they achieved a high degree of success, Mr Hancock reports.

When the work of IEC 2B started seven years ago, the problem before the international subcommittee was found to be so large that it was decided to limit the work to foot-mounted three-phase squirrel-cage motors having shaft heights from about 100 mm to about 300 mm. It was also decided to consider only the principal mounting dimensions without reference to ratings.

During the seven years that the committee has been at work, other items have been brought in for consideration. These include mounting dimensions of smaller induction motors, standardization of shaft dimensions and maximum rated torque on each, standardization of flanges for flange-mounting these motors, nomenclature, and standardization of output ratings.

Proposals agreed upon at the Stockholm meeting are being sent to letter ballot of the national committees of the International Electrotechnical Commission. These include recommended IEC standard dimensions for foot-mounted motors with shaft heights between $4\frac{1}{2}$ - $12\frac{1}{2}$ in.; recommended IEC standard dimensions for foot-mounted motors with shaft heights less than 112 mm; recommended IEC shaft extension dimensions based on millimeter dimensions and based on inch dimensions; dimensions for mounting flanges based on metric dimensions and based on inch dimensions; and recommended output ratings.

- The American Society for Testing Materials will increase its activity in the organic solvents field by establishing a new committee to concentrate on the solvents containing halogens. These include chlorine, fluorine, trichloroethylene, perchloroethylene, and solvent mixtures containing these halogenated solvents.

An organizing committee under the chairmanship of M. A. Pinney is undertaking the preliminary work to set up Committee D-26 on Halo-

generated Organic Solvents. It is planned to organize the committee formally at the annual meeting of the Society during the week of June 22-27, 1958. The recommended scope of the committee is "the promotion of knowledge pertaining to halogenated organic solvents and admixtures thereof including formulation of specifications, definitions, and methods of test." Standards peculiar to electrical insulating liquids, paint thinners, and nonhalogenated components of admixtures normally are excluded from the scope of Committee D-26 and developments in these fields incidental to the work of Committee D-26 will be coordinated with the appropriate technical committees of the Society.

- Gordon B. Tebo was appointed manager of the Canadian Standards Association's testing laboratories early this year. Mr Tebo has served as director of research, director of employee relations, and director of the Organization Services Division. He is also a member of the Board of Directors of the Canadian Standards Association.

- Perry L. Houser, president of the Metal Cutting Tool Institute, was elected chairman of ASA's Mechan-



P. L. Houser

cal Standards Board early this year after having served as vice-chairman of the MeSB from 1955-1957. Mr Houser is well acquainted with problems of committees under the supervision of the MeSB. While in charge of the Manufacturing Standards Research Section at the International Harvester Company, he was chairman of Sectional Committee B5, Small Tools and Machine Tool Elements, from 1947-1954. Mr Houser was awarded the ASA Standards Medal in 1953 for his leadership in the development and application of

voluntary standards in this country.

H. W. Robb, manager of company standards, General Electric Company, Schenectady, was elected



H. W. Robb

vice-chairman of the Mechanical Standards Board. He has been a member of MeSB since 1951. Mr Robb represents General Electric in ASA's Company Member Conference; the American Society of Mechanical Engineers on ASA's Standards Council; and the National Electrical Manufacturers Association on the Mechanical Standards Board and on numerous ASA sectional committees. He is also chairman of Committee Z55, Colors for Industrial Apparatus and Equipment, and Committee B18, Dimensional Standardization of Bolts, Nuts, Rivets, Screws, and Similar Fasteners. In addition, he takes an active part in ABC Conferences on Screw Threads and on Limits and Fits.

- Three international subcommittees are now at work on standardization problems concerning use of

nuclear energy. The subcommittees were organized by Technical Committee 85 of the International Organization for Standardization. Subcommittee 1 is working on terminology, definitions, units, and symbols. The American Standards Association (USA) holds the secretariat. Radiation Protection, Subcommittee 2, is under the leadership of AFNOR (France), which holds the secretariat. Reactor Safety is in the hands of Subcommittee 3, with the British Standards Institution (UK) as the secretariat.

A meeting of these subcommittees will be held at Harrogate, England, June 9-21, during the ISO assembly.

- Courtaulds (Alabama), Inc., recently announced adoption of the American Standard L22 performance standards for finished rayon and acetate fabrics. The company is now using these standards as the basis for tests in connection with the merchandising of Coloray solution dyed rayon staple.

The standards set forth minimum requirements for performance and care of rayon and acetate and mixed finished goods in specific apparel and home furnishing end uses.

Hang-tags referring to the L22 standards are to be used by Courtaulds to identify the fabric that meets the standard requirements.

- A Proposed American Standard on secondary network transformers has been published for trial and

GAILLARD SEMINAR ON INDUSTRIAL STANDARDIZATION

The next Gaillard Seminar on Industrial Standardization will be held in the Engineering Societies Building, New York City, from June 23 through 27, 1958. There will be ten conferences, one each morning and afternoon, Monday through Friday.

The primary objective of the Gaillard Seminar is to assist top management in setting up a standards organization in a company, establishing a procedure for handling the work, and training staff men in the functions of the standards engineer, including the art of writing specifications. Attention is given to standardization at all industrial levels, from the operating unit in a company (department, division, etc) to international unification of standards. Also, special conditions arising from mergers, acquisitions, diversification, and maintenance of liaison between company activities in the United States and abroad, are reviewed. A full day is reserved for round-table discussion of problems of particular interest to the companies represented at the seminar.

For details and registration, write to Dr John Gaillard, Box 273, Route 1, Briarcliff Manor, N. Y.

criticism. This is a report prepared by the Joint Committee of the Edison Electric Institute and the National Electrical Manufacturers Association. It contains design standards for certain mechanical and electrical features of three-phase, liquid-immersed, subway- and vault-type secondary network transformers rated 1,000 kva and smaller, high voltage 27,060 volts and below, low voltage 216Y/125 volts.

The proposed standard is divided into two parts. Part A covers transformers having a three-position disconnecting and grounding switch. Part B covers transformers having a two-position grounding switch.

"The preparation of this first report on secondary network transformers has proved to be a rather formidable task," the committee reports. "It is always difficult to establish standards covering equipment for which no national standard has ever existed and where several standards have been developed to suit individual users."

Comments and suggestions will be welcomed.

Copies of the Proposed American Standard EEI-NEMA Standards for Secondary Network Transformers, Subway and Vault Types (Liquid Immersed), C57.12, Section 40, can be obtained from the American Standards Association, 70 East 45 Street, New York, N. Y., at 80 cents each.

- British industry recently proposed that the British Standards Institution set up an "approvals board" for domestic electrical appliances. At a meeting last fall, at British Standards House, high-level representatives of all sections of the British electrical supply, manufacturing, and distributing industries, and consumers agreed that an approvals service would be desirable.

A committee is now engaged in drafting the details of a proposed scheme for setting up the recommended "approvals board." It will include a certification mark, accompanied by appropriate wording, to indicate that the goods bearing it comply with nationally recognized standards and good British practice.

British action to assure maintenance of its high standards is accelerated by the possibility of the development of the European Free Trade Area.

- The International Organization for Standardization announces that the national standards body of Egypt is now a member of ISO. The address is Egyptian Organization for Standardization and Calibration, 144, Tahrir Street Dokky, Cairo, Egypt.

- New York State is extending its uniform traffic control signs and devices to municipal and local highways as well as state highways in line with a new Uniform Rules of the Road Law which becomes effective July 1, 1958. A new edition of the State's Manual of Uniform Traffic Control Devices is being prepared. Lloyd A. Maeder, director of the State Traffic Commission, explains that both the 1948 Manual and the one which will be in effect after July 1 do and will conform to the American Standard (National) Manual on Uniform Traffic Control Devices, insofar as practicable. The important differences will be in signs required by certain laws in New York State that are different from or are not provided for in the American Standard Manual. Where similar signs exist they will conform to the American Standard Manual with respect to shape and color. Any deviation in size will be to provide a larger sign, not a smaller one, Mr Maeder explains.

- F. P. Brown, chief, shops division, National Bureau of Standards, will attend the meeting of ISO Technical Committee 29, Small Tools, in April in Berlin on behalf of Sectional Committee B5, Small Tools and Machine Tool Elements.

- The two latest sections of the American Drafting Standards Manual—Section 6 on Screw Threads and Section 3 on Projections—have just been published.

Developed by 23 national organizations, including the Department of Defense, represented on ASA Committee Y14 on Drafting Practice, these are two of six standards approved recently by the American Standards Association. This project is sponsored by the American So-

ciety for Engineering Education and the American Society of Mechanical Engineers.

Other standards in this series which have been approved by ASA and published by the American Society of Mechanical Engineers are sections 1, Size and Format; 2, Line Conventions, Sectioning and Lettering; 4, Pictorial Drawing; and 5, Dimensioning and Notes.

Professor R. P. Hoelscher, head of the Department of General Engineering, University of Illinois, is chairman of ASA Committee Y14.

The committee has under preparation and at various stages of completion other sections of the manual covering standard drafting practice for gears, splines, and serrations; castings; forging; metal stamping; plastics; die castings; springs—helical and flat; mechanical structures; electrical diagrams; tools; dies and gages; and hydraulic and pneumatic diagrams. Each section is handled by one of the eighteen Y14 subcommittees.

Section 3 on Projections, Y14.3-1957, and Section 6 on Screw Threads, Y14.6-1957 can be obtained from the American Standards Association at \$1.50 per copy.

- A standard for measuring the sound output of air conditioning equipment will be prepared by a joint committee of the American Society of Heating and Air Conditioning Engineers and the American Society of Refrigerating Engineers. The work will be based on data developed from a fan-noise program conducted at the ASHAE Research Laboratory, Cleveland, Ohio. This was an investigation of four methods for determining the acoustic power output of a fan by octave-band analysis.

Previous standards for rating the noise output of fans were based only upon over-all sound levels with little regard for the frequency distribution of their sound spectrum, ASHAE reports. Experience has shown that this frequency distribution is important from the standpoint of both loudness and annoyance, and also in choosing the type and method of acoustic treatment needed to reduce the noise level.

The relationships between noise

level and frequency distribution, and their effects on annoyance, speech interference, and speech audibility, are being established by various investigations throughout the country.

In an air conditioning system the common noise source is an air-moving device, such as a fan or blower, and the noise path may be the duct system which couples the air-moving device to the conditioned space.

Since criteria have been established regarding annoyance and its relationship to noise level and frequency distribution for different types of environment, it follows then that for effective noise control in an air conditioning system, in order to obtain a desired criteria, the acoustic characteristics of the duct system and the noise output of the fan must be known or readily measured, ASHAE explains.

There are still many aspects concerning the attenuation of sound in ducts and components which should be studied. ASHAE plans future study of sound transmission through duct walls, the noise attenuation of lined and unlined ducts, and the generation and attenuation of sound at branch takeoffs.

- The United States and Canada have submitted a new proposal for a Draft ISO Recommendation of an inch system of screw threads for consideration by the ISO Technical Committee on Screw Threads, ISO/TC 1. It includes thread sizes below $\frac{1}{4}$ inch and expands the coverage of constant pitch series in the larger diameters. Effect of the latter is to make available a greater number of fine threads.

The U.S.-Canadian proposal will be considered at a meeting of ISO/TC 1 called by the Swedish standards body, secretariat for the committee. This meeting will be held at Harrogate, England, June 16 and 17.

A proposal by the United Kingdom for the Draft ISO Recommendation for an inch system of screw threads was approved at a meeting of the ISO/TC 1 committee in Lisbon in May 1957. Since then a good deal of progress has been made in development of the unified thread. The new proposal reflects these advances.



Standards Outlook

by LEO B. MOORE

Mr Moore is Associate Professor of Industrial Management, Massachusetts Institute of Technology, where he teaches a full-term course in industrial standardization.

Creative Thinking

No field of endeavor, least of all standards, will ever suffer from having too many ideas. If there is any danger that we face it rests in the complacency of practice and the assurance of experience, which lull us into a false sense of knowledge. No poor idea can ever be so threatening to our future as no idea at all. No radical idea can ever be so upsetting to our self-sufficiency as no idea at all. The danger we face lies not in having ideas but in not having ideas.

Our industrial economy, founded in applied imagination and on inventive genius, is experiencing a great upsurge of concern for creative thinking. As we sweep on to ever-accelerating change and broader improvement, the demand for ideas has seemingly become insatiable. This is particularly true at the company level where techniques such as brainstorming have become very popular as a source of ideas for apparently every facet of the business. From the business world, brainstormers have extended their method into community and home activity until we find it on all sides. These efforts are in addition to the enormous funds of time and money being expended by industrial, educational, and governmental groups upon basic and applied research. All hopefully add to our stock of knowledge and our store of wisdom.

This encouragement of creativity should be incorporated soon in our standards programs. Publications, such as THE MAGAZINE OF STANDARDS, are piling up a wealth of experience and practice as they report the standards news of company, association, and society endeavors. This history provides confidence of approach and correctness of answer for the standards engineer in his daily work. The danger of imitation is obvious, however, for in the long term we run out of ideas and the practice of having ideas, or at least of thinking about having and using them.

Brainstorming and other techniques similar to it fairly conclusively prove that the human skill to generate ideas must be encouraged, nurtured, and developed like other skills. Nothing helps like practice. The failure to practice has the same impact on creativity as it does on playing the piano or on a game of golf. We must establish the creative mood or climate and practice regularly in the things we do whether at work or play, in the office or at home. And what's more, it can be fun.

Recently the Boston section of the Standards Engineers Society had a brainstorming session and some 40 members contributed over 275 ideas on the topic of the evening. No one could help but be struck by the marvelous creativity inherent in these assembled standards engineers, and yet ask how much finds its way into company standards programs. Ideas are not like dollars. If we swap ideas, we both have two, and perhaps a third will be born out of the exchange. But ideas can mean dollars. For nothing has such an impact on our business as good ideas in the hands of our competitors. Let us become known as those competitors with the ideas. In the standards field, let's experiment. Let's try out the idea that won't work. Let's see if there is anything to this creative thinking.

AMERICAN STANDARDS UNDER WAY

Status as of March 25, 1958

Legend — *Standards Council* — Approval by Standards Council is final approval as American Standard; usually requires 4 weeks. *Board of Review* — Acts for Standards Council and gives final approval as American Standard; action usually requires 2 weeks. *Standards Board* — Approves standards to send to Standards Council or Board of Review for final action; approval by standards boards usually takes 4 weeks.

Note — Send check when ordering standards listed as published to avoid service charge for handling.

BUILDING AND CONSTRUCTION

In Standards Board

Fire Tests of Door Assemblies, Methods of, ASTM E 152-56T; ASA A2.2- (Revision of ASTM E 152-55T; NFPA 252; ASA A2.2-1956)

Sponsors: National Bureau of Standards; National Fire Protection Association; American Society for Testing Materials

Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units, Specifications for, ASTM C 126-57T; ASA A101.1- (Revision of ASTM C 126-55T; ASA A101.1-1956)

Sponsor: American Society for Testing Materials

CHEMICAL INDUSTRY

American Standard Published

Common Name for the Pest Control Chemical 0,0,0',0'-tetraethyl S,S'-methylene bisphosphorodithioate (ethion) K62.12-1958 \$0.25

Sponsor: U. S. Department of Agriculture

American Standard Approved

Common Name for the Pest Control Chemical 3-phenyl-1,1-dimethylurea (fenuron) K62.7-1958

Sponsor: U. S. Department of Agriculture

In Standards Board

Trisodium Phosphate, Specification for, ASTM D 538-57; ASA K60.12- (Revision of ASTM D 538-55T; ASA K60.12-1956)

Sponsor: American Society for Testing Materials

DRAWINGS, SYMBOLS, AND ABBREVIATIONS

In Standards Board

American Drafting Standards Manual, Section 7, Gears, Splines and Serrations, Y14.7-

Sponsors: American Society of Engineering Education; American Society of Mechanical Engineers

ELECTRIC AND ELECTRONIC

American Standards Published

Specialty Transformers, Safety Standard for, C33.4-1958 (Revision of C33.4-1956) \$1.00

Sponsor: Underwriters' Laboratories

Outlet Receptacles, Attachment Plug Caps, and Appliance Plugs, C73.1-1957 (Revision of C73-1941 and C73a-1953) \$1.50

Sponsor: National Electrical Manufacturers Association

Method for the Designation of Mercury Lamps, C78.380-1957 \$0.35

96 Inch (800 milliamperes) T-12 Rapid Start Fluorescent Lamp, Dimensional and Electrical Characteristics of, C78.702-1958 \$0.25

72 Inch T-12 Rapid Start (Recessed Double Contact) Fluorescent Lamp, Dimensional and Electrical Characteristics of, C78.703-1958 \$0.25

Sponsor: Electrical Standards Board

Fluorescent Lamp Ballasts, Specifications for, C82.1-1958 (Revision of C82.1-1956) \$0.50

Fluorescent Lamp Reference Ballasts, Specification for, C82.3-1957 (Revision of C82.3-1956) \$0.35

Sponsor: Electrical Standards Board

American Standards Approved

Soft Rectangular and Square Bare Copper Wire for Electrical Conductors, Specifications for, ASTM B 48-57; ASA C7.9-1958 (Revision of ASTM B 48-55; ASA C7.9-1956)

Copper Covered Steel Wire, Specifications for, ASTM B 227-57; ASA C7.17-1958 (Revision of ASTM B 227-52; ASA C7.17-1953)

Concentric-Lay-Stranded Aluminum Conductors, Hard-Drawn and Three-Quarter Hard-Drawn, Specifications for, ASTM B 231-57; ASA C7.21-1958 (Revision of ASTM B 231-55; ASA C7.21-1956)

Concentric-Lay-Stranded Aluminum Conductors, Steel-Reinforced, Specifications for, ASTM B 232-57; ASA C7.22-1958 (Revision of ASTM B 232-55T; ASA C7.22-1956)

Resistivity of Electrical Conductor Materials, Method of Test for, ASTM B 193-57; ASA C7.24-1958 (Revision of ASTM B 193-49; ASA C7.24-1951)

Standard Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors, Specifications for, ASTM B 258-57; ASA C7.36-1958 (Revision of ASTM B 285-51T; ASA C7.36-1956)

Hookup Wire, Specifications for, ASTM B 286-57; ASA C7.39-1958

Aluminum Wire Communications Cable, Specifications for, ASTM B 314-57T; ASA C7.40-1958

Sponsor: American Society for Testing Materials

Apparatus Bushings (Used with Power Circuit Breakers and Outdoor Transformers), Dimensional and Electrical Characteristics of, C76.1a-1958 (Supplement and partial revision of C76.1-1943)

Sponsor: American Institute of Electrical Engineers

In Board of Review

Designation of Miniature Lamps, Method for the, C78.390-

Sponsor: Electrical Standards Board

In Standards Board

Metallic Coverings for Insulated Wire and Cable, Specifications for, C8.15- (Revision of C8.15-1942)

Sponsor: Electrical Standards Board

Residential Wiring Handbook, C91.1-

Sponsor: Industry Committee on Interior Wiring Design

American Standard Withdrawn

Apparatus Bushings (Used with Power Circuit Breakers and Outdoor Transformers), Electrical and Mechanical Characteristics of, C37.4a-1954

Sponsor: Electrical Standards Board

Withdrawal Being Considered

Miniature Incandescent Lamps, C78.140-1956

Sponsor: Electrical Standards Board

Project Being Considered

Coupling Capacitors, Coupling Capacitor Potential Devices, and Line Traps, C93

Proposed Sponsors: American Institute of Electrical Engineers; National Electrical Manufacturers Association

Proposed Scope: Standards, specifications, methods of test, and definitions for coupling capacitors, coupling capacitor potential devices, and line traps for electric power lines.

MATERIALS HANDLING

In Standards Board

55-Gallon Tight Head Universal Drum, ICC-17E, MH2.1-

55-Gallon Full Open Head Universal Drum, MH2.2-

55-Gallon Tight Head Universal Drum, ICC-5B, MH2.3-

55-Gallon Tight Head Universal Drum, ICC-17C, MH2.4-

55-Gallon Full Open Head Universal Drum, ICC-17H, MH2.5-

30-Gallon Tight Head Universal Drum, ICC-17E, MH2.6-

16-Gallon Tight Head Universal Drum, MH2.7-

16-Gallon Full Open Head Lug Cover Universal Drum, MH2.8-

5-Gallon Tight Head Universal Drum, ICC-17E, MH2.9-

5-Gallon Lug Cover Universal Pail, MH2.10-

Sponsor: Steel Shipping Container Institute

Project Being Considered

Sizes of Shipping Containers

Proposed Sponsors: American Material Handling Society; American Society of Mechanical Engineers

Proposed Scope: Standardization of sizes of pallet containers, cargo containers, and van containers for integrated transportation.

MECHANICAL

American Standard Published

Markings for Grinding Wheels and Other Bonded Abrasives, B5.17-1958 [Revision of B5.17-1949 (R1953)] \$1.00

Sponsors: American Society of Mechanical Engineers; Metal Cutting Tool

Institute; National Machine Tool Builders' Association; Society of Automotive Engineers; American Society of Tool Engineers

American Standards Approved

Machine Pins, B5.20-1958 (Revision of B5.20-1954)

Sponsors: American Society of Mechanical Engineers; National Machine Tool Builders' Association; Society of Automotive Engineers; Metal Cutting Tool Institute; American Society of Tool Engineers

Mechanical Refrigeration Installations on Shipboard, Recommended Practice for, B59.1-1958 (Revision of B59.1-1950)

Sponsor: American Society of Refrigerating Engineers

In Board of Review

Mounting Dimensions of Lubricating and Coolant Pumps for Machine Tools, B5.28- (Revision of B5.28-1952)

Sponsors: American Society of Tool Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers; American Society of Mechanical Engineers

In Standards Board

Evaluating Static and Dynamic Load Ratings for Ball and Roller Bearings, Method of, B3.11-

Sponsor: Mechanical Standards Board

Reaffirmation Being Considered

High-Strength High-Temperature Internal Wrenching Bolts, B18.8-1950

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

MINING

American Standard Approved

Construction and Maintenance of Rail Haulage Roads in Coal Mines, M7.3-1958

Sponsor: American Mining Congress

Reaffirmation Approved

Construction and Maintenance of Ladders and Stairs for Mines, M12.1-1946 (R1958)

Sponsor: American Mining Congress

American Standards Withdrawn

Frogs, Switches and Turnouts for Coal Mine Tracks (Light-Rail Turnouts), M7.1-1933

Frogs, Switches and Turnouts for Coal Mine Tracks for 70-lb and 80-lb Rail, M7.2-1935

Sponsor: American Mining Congress

PHOTOGRAPHY

American Standard Published

General-Purpose Photographic Exposure Meters (Photoelectric Type), PH2.12-1957 (Revision of Z38.2.6-1948) \$0.75

Sponsor: Photographic Standards Board

In Standards Board

Curl of Photographic Film, Methods for Determining the, PH1.29-

Film in Rolls for Recording Instruments, Graphic Arts, Photo Typesetting, Portrait, X-ray and Related Use, Dimensions for, PH1.30-

Sponsor: Photographic Standards Board

Sensitometric Exposure of Daylight-Type Color Films, PH2.11-

Sponsor: Photographic Standards Board

Sulfuric Acid, Specifications for Photographic Grade, PH4.101- (Revision of Z38.8.101-1949)

Citric Acid, Monohydrate, Specifications for Photographic Grade, PH4.102- (Revision of Z38.8.102-1949)

Boric Acid, Crystalline, Specifications for Photographic Grade, PH4.103- (Revision of Z38.8.103-1949)

Hydrochloric Acid, Specifications for Photographic Grade, PH4.104- (Revision of Z38.8.104-1949)

Catechol, Specifications for Photographic Grade, PH4.131- (Revision of Z38.8.131-1948)

Formaldehyde, Specifications for Photographic Grade, 37-Percent Solution, PH4.152- (Revision of Z38.8.152-1949)

Sodium Sulfate Anhydrous, Specifications for Photographic Grade, PH4.175- (Revision of Z38.8.175-1949)

Sodium Bisulfite, Anhydrous, Specifications for Photographic Grade, PH4.276- (Revision of Z38.8.276-1949)

Sponsor: Photographic Standards Board

Focal Lengths and Markings of 35mm Motion-Picture Projection Lenses, PH22.28- (Revision of Z22.28-1946)

Dimensions for 35mm Motion-Picture Film, Perforated 32 mm, 2R-2994, PH22.73- (Revision of PH22.73-1951)

100-Mil Magnetic Coating on 16mm Film, Perforated One Edge, PH22.87- (Revision of PH22.87-1953)

Scene-Change Cueing for Printing 16mm Motion-Picture Film, PH22.89-

Four Magnetic Sound Records on 35mm Film, PH22.108-

Picture and Sound Apertures for Continuous Contact Printers for 35mm Release Prints with Photographic Sound, PH22.111-

Picture-Sound Separation in 16mm Magnetic Sound Projectors, PH22.112-

Sponsor: Society of Motion Picture and Television Engineers

PIPE AND FITTINGS

American Standard Published

Brass Fittings for Flared Copper Tubes, B16.26-1958 (Revision of A40.2-1936) \$1.00

Sponsor: American Society of Mechanical Engineers; Mechanical Contractors Association of America; Manufacturers Standardization Society of the Valve and Fittings Industry

American Standards Approved

Standard Strength Perforated Clay Pipe, Specifications for, ASTM C 211-57T; ASA A106.1-1958 (Revision of ASTM C 211-50; ASA A106.1-1954)

Standard Strength Clay Sewer Pipe, Specifications for, ASTM C 13-57T; ASA A106.3-1958 (Revision of ASTM C 13-54; ASA A106.3-1955)

Standard Strength Ceramic Glazed Clay Sewer Pipe, Specifications for, ASTM C 261-57T; ASA A106.4-1958 (Revision of ASTM C 261-54; ASA A106.4-1955)

Sponsor: American Society for Testing Materials

Brass and Bronze Screwed Fittings, 125 lb, B16.15-1958 (Revision of B16.15-1947)

Sponsors: American Society of Mechanical Engineers; Mechanical Contractors Association of America; Manufacturers Standardization Society of the Valve and Fittings Industry

Reaffirmation Being Considered

Malleable-Iron Screwed Fittings, 150 lb, B16.3-1951

Malleable-Iron Screwed Fittings, 300 lb, B16.19-1951

Sponsors: American Society of Mechanical Engineers; Mechanical Contractors Association of America; Manufacturers Standardization Society of the Valve and Fittings Industry

TEXTILES

American Standards Published

Accelerated Aging of Textiles Dyed with Sulfur Colors, AATCC Standard Test Method 26-52; ASA L14.1-1956 (Revision of ASA L14.1-1949) \$0.30

Colorfastness to Acids and Alkalies, AATCC Standard Test Method 6-52; ASA L14.2-1956 (Revision of ASA L14.2-1949) \$0.30

Colorfastness of Wool Textiles to Carbonizing, AATCC Standard Test Method 11-52; ASA L14.3-1956 (Revision of ASA L14.3-1949) \$0.30

Colorfastness of Silk Textiles to Degumming, AATCC Standard Test Method 7-52; ASA L14.4-1956 (Revision of ASA L14.4-1949) \$0.30

Colorfastness of Wool Yarn to Fulling, AATCC Standard Test Method 2-52; ASA L14.5-1956 (Revision of ASA L14.5-1949) \$0.30

Colorfastness of Wool Textiles to Mill Washing and Scouring, AATCC Standard Test Method 1-52; ASA L14.6-1956 (Revision of ASA L14.6-1949) \$0.30

Colorfastness of Silk Textiles to Peroxide Bleaching, AATCC Standard Test Method 13-52; ASA L14.7-1956 (Revision of ASA L14.7-1949) \$0.30

Evaluation of Ordinary Wetting Agents, AATCC Standard Test Method 17-52; ASA L14.11-1956 (Revision of ASA L14.11-1949) \$0.60

Colorfastness to Perspiration, AATCC Standard Test Method 15-52; ASA L14.56-1956 (Revision of ASA L14.56-1951) \$0.30

Colorfastness to Plecting, AATCC Tentative Test Method 31-52; ASA L14.63-1956 (Revision of ASA L14.63-1951) \$0.30

Colorfastness of Silk Textiles to Mill Washing, AATCC Standard Test Method 4-52; ASA L14.70-1956 \$0.30

Colorfastness to Dry and Wet Heat (Hot Pressing), AATCC Tentative Test Method 5-52; ASA L14.71-1956 \$0.30

Colorfastness to Rubbing (Crocking), AATCC Standard Test Method 8-52; ASA L14.72-1956 \$0.30

Detection of Phototropism, AATCC Tentative Test Method 32-52; ASA L14.73-1956 \$0.30

Evaluation of Textiles for Wettability, AATCC Tentative Test Method 39-52; ASA L14.75-1956 \$0.30

Dimensional Changes in Textiles, (Other Than Cotton and Linen), AATCC Tentative Test Method 40-52; ASA L14.76-1956 \$0.30

Dimensional Changes in Wool Textiles (Accelerated Test), AATCC Tentative Test Method 41-52; ASA L14.77-1956 \$0.30

Evaluation of Penetrants for Mercerization, AATCC Tentative Test Method 43-52; ASA L14.79-1956 \$0.30

Accelerated Washfastness Tests Nos. 2A, 3A, and 4A (Cotton) AATCC Standard Test Method 61-54; ASA L14.81-1956 \$0.30

Evaluation of the Resistance of Wool Oils to Oxidation in Storage, AATCC Standard Test Method 62-52; ASA L14.82-1956 \$0.30

Colorfastness to Water, AATCC Standard Test Method 63-52; ASA L14.83-1956 \$0.30

Evaluation of Continuous Scouring of Raw Grease Wool, AATCC Standard Test Method 64-52; ASA L14.84-1956 \$0.60

Damage Caused by Retained Chlorine, AATCC Tentative Test Method 69-52; ASA L14.86-1956 \$0.30

Shrinkage of Wool Hose: Accelerated Test, AATCC Tentative Test Method 73-53; ASA L14.88-1956 \$0.30

Sponsors: American Association of Textile Chemists and Colorists; American Society for Testing Materials

WHAT'S NEW ON AMERICAN STANDARDS PROJECTS

Transformers, Regulators, and Reactors, C57—

Sponsor: Electrical Standards Board

An error has been found in the Proposed American Standard Secondary Network Transformers, Subway and Vault Types (Liquid Immersed), C57.12, Section 40. In the elevation view of Figure N5 (13), page 9, the identification of the terminals now reading H_1 , H_2 , H_3 , should read: H_3 , H_2 , H_1 .

Mechanical Shock and Vibration, S2—

Sponsor: Acoustical Society of America

Following reorganization of Sectional Committee Z24 on Acoustics, Vibration, and Mechanical Shock, and reassignment of its work to three successor committees, the development of standards on mechanical shock and vibration is being undertaken by Sectional Committee S2 under the chairmanship of Horace M. Trent.

Dr Trent is head of the Applied Mathematics Branch, Mechanics Division, Naval Research Laboratory,



Horace M. Trent

Washington, D. C. He is also an associate professor of electrical engineering at the University of Maryland. Dr Trent received his Ph.D. in Physics from Indiana University in 1934. He is a Fellow of the Acoustical Society of America and a member of the American Mathematical Society, the Washington Academy of Sciences, and the Philosophical Society of Washington. Dr Trent is the author of numerous scientific papers.

Charles E. Crede, vice-president, Barry Controls, is the committee's

vice-chairman. Having received his Master of Science in Mechanical Engineering from the Massachusetts In-



Charles E. Crede

stitute of Technology, Mr Crede held positions with the Standard Railway Equipment Manufacturing Company, the Electrical Section of the Bureau of Ships, as well as the Naval Research Laboratory where he was in charge of the organization of the shock and vibration division. He joined Barry Controls shortly after the war. Mr Crede is a member of the Society for Experimental Stress Analysis, the Acoustical Society of America, and the American Society of Engineering Education.

Sectional Committee S2 held its organization meeting on December 5, 1957. The committee is working under the following scope: Standards, specifications, methods of measurement and test, and terminology in the fields of mechanical shock and vibration, but excluding those aspects which pertain to biological safety, tolerance, and comfort.

Working groups of Committee S2 are presently preparing drafts on proposed standards on vibration testing machines, mechanical impedance of structures, resilient mountings, and calibration of shock and vibration measuring instruments. A proposed standard on shock-testing machines for electronic components has been circulated for comments to both manufacturers and users to ascertain the acceptability of the standard by all concerned.

A draft specification for the design, construction, and operation of vari-

able duration, medium-impact shock-testing machine for lightweight equipment has been reviewed by the committee with the result that a new draft will have to be prepared to meet all the requirements on this subject. Studies are being made to decide whether work should be done on projects concerning techniques of vibration measurement; reduction of shock and vibration data; damping of materials; and balancing of machinery.

The committee will hold its next meeting in Washington, D. C., on May 8.

Elevators, Dumbwaiters, and Escalators, A17—

Sponsors: American Institute of Architects; American Society of Mechanical Engineers; National Bureau of Standards

Moving sidewalks for transporting people present safety problems which could be solved by a safety code developed under the procedures of the American Standards Association. This was the consensus of a general conference of government officials, manufacturers, and users at ASA headquarters March 4.

The conference recommended to the American Standards Association that safety standards for passenger conveyors be developed, and that the present ASA Committee A17 on Elevators, Dumbwaiters, and Escalators develop the standards. This committee developed the American Standard safety code which has been adopted by almost a thousand municipalities. The current edition is identified as A17.1-1957. The Conference also recommended that the membership of the committee be enlarged to include representatives of those national organizations concerned with passenger conveying equipment.

Urging elevator and passenger conveyor people to agree on a rapid way to turn out American Standards, R. L. Higgins, New Jersey Department of Labor and Industry, who represented the International Association of Governmental Labor Officials, said:

"We are trying for the interest of

our people to see that New Jersey is a progressive state. We are looking for a code that we know is good, one that we can adopt immediately for the protection of our people. These installations are being made now and it is urgent that there be standards prepared without further delay. We want American Standards on passenger conveyors because they will be best for this state and for every other state in the union."

The Safety Standards Board of ASA is now voting on the question of enlarging the scope of project A17, Safety Code for Elevators, in line with the recommendations of the conference. The Board has been asked to vote on whether to include "passenger-carrying conveyors, with the understanding that passenger-carrying conveyors are a type of passenger-carrying device where the passenger-carrying surface remains flat and parallel to its line of motion." If the Board decides to take this action, the membership of the A17 committee will be enlarged to include adequate representation from national organizations interested in the enlarged scope.

Code for Pressure Piping, B31—

Sponsor: American Society of Mechanical Engineers

Interpretation submitted by the sponsor.

From time to time actions taken by Sectional Committee B31 are published for the information of all who are interested in use of the American Standard Code for Pressure Piping, B31.1-1955. While these actions do not constitute formal revision of the Code, they may be utilized in specifications, or otherwise, as representing the considered opinion of the committee.

Case No. 30 is published below as interim action of Sectional Committee B31 on the Code for Pressure Piping, but will not constitute a part of the Code until formal action has been taken by The American Society of Mechanical Engineers as sponsor and by the American Standard Association on approval of a revised edition.

Case No. 31 was published in the February 1958 issue of THE MAGAZINE OF STANDARDS. Case No. 32, concerning use of centrifugally cast steel pipe will be published in the May issue.

CASE 30

Inquiry: May piping be designed and constructed under Division A of Section 3 of American Standard B31.1-1955, Code for Pressure Piping, for service temperatures below —20F?

Reply: It is the opinion of the committee that piping within the scope of Division A of Section 3 of ASA B31.1-1955 may be designed and constructed for service temperatures below —20 F provided that the following conditions are met:

1. The materials used for pressure-containing parts and stress-carrying structural elements intimately attached to the pipe shall conform to the appropriate specifications and shall be used within the indicated temperatures and stress limitations shown in Table 1.
2. All such materials shall be impact tested and meet the requirements of Paragraph UG-84 of Section VIII of the ASME Boiler and Pressure Vessel Code, with the following exceptions:
 - (a) Austenitic chromium-nickel steels with not more than 0.10 C except weld metal
 - (b) Nonferrous materials
 - (c) Bolting materials to ASTM A-193 B7 and B7A
3. A set of test specimens shall be made to test the weld metal and the heat-affected zone of the base material for each range of ¼ inch of pipe thickness used.
4. Welded joints in piping which is to operate at temperatures below —20 F shall be stress relieved in accordance with the methods specified in Paragraph 632 of ASA B31.1-1955, except that those materials which are exempt from impact tests need not be stress relieved.
5. Thermal expansion data for materials in low temperature services are given in Table 2.
6. Moduli of elasticity and torsional rigidity of ferrous and nonferrous materials in low temperature services are given in Table 3.

TABLE 1

ASTM Spec	Material	Grade	Min Temp. °F	Max Allowable Stress (psi)
A193	Alloy-steel bolting materials for high-temperature service	B7 B7A	— 50 — 50	20000 20000
A333	Seamless and welded steel pipe for low-temperature service	C 3 5	— 50 —150 —150	18350 21650 21650
A334	Seamless and welded steel tubes for low-temperature service	C 3 5	— 50 —150 —150	18350 21650 21650
A312	Seamless and welded austenitic stainless steel pipe	TP 304 TP 309 TP 310 TP 321 TP 347 TP 316 TP 317	—325 —325 —325 —325 —325 —325 —325	18750 18750 18750 18750 18750 18750 18750
A358	Electric - fusion - welded austenitic chromium-nickel alloy steel pipe for high - temperature service	S M C T 309 310	—325 —325 —325 —325 —325 —325	16000 16000 16000 16000 16000 16000
A352	Ferritic steel castings for pressure - containing parts suitable for low-temperature service	LCB LC1 LC2 LC3	— 50 — 75 —100 —150	16250 16250 16250 16250
A376	Seamless austenitic steel pipe for high-temperature central station service	TP 304 TP 321 TP 316 TP 347	—325 —325 —325 —325	18750 18750 18750 18750
A249	Welded austenitic stainless steel boiler, superheater, heat exchanger and condenser tubes	TP 304 TP 310 TP 316 TP 317 TP 321 TP 347	—325 —325 —325 —325 —325 —325	16000 16000 16000 16000 16000 16000

TABLE 1 (Continued)

A271 Seamless austenitic chromium - nickel steel still tubes in refinery service	TP 304	-325	18750
	TP 321	-325	18750
	TP 347	-325	18750
A269 Seamless and welded austenitic stainless steel tubing in general service	TP 304	-325	18750
	TP 316	-325	18750
	TP 317	-325	18750
	TP 321	-325	18750
	TP 347	-325	18750
A182 Forged or rolled alloy steel pipe flanges, forged fittings, and valves and parts in high-temperature service	F 304	-325	18750
	F 347	-325	18750
	F 321	-325	18750
	F 316	-325	18750
	F 310	-325	18750
	F 10	-325	18750
A350 Forged or rolled carbon and alloy steel flanges, forged fittings, and valves and parts in low-temperature service	LF 1	-50	18750
	LF 3	-150	23250
A351 Ferritic and austenitic steel castings for high-temperature service	CF8C	-325	17500
	CF8M	-325	17500
A300 Steel plates for pressure vessels for low-temperature service			
Flange or Firebox Quality	Class 1	-50	
Flange or Firebox Quality	A201A		13750
	A201B		15000
Firebox Quality	Class 2	-75	
Firebox Quality	A203A		16250
	A203B		17500
Firebox Quality	Class 3	-150	
Firebox Quality	A203D		16250
	A203E		17500
	Class 4	-320	
	A353		22500
A320 Alloy steel bolting material in low-temperature service	L 7	-150	20000
	L 10	-150	20000
	L 43	-150	20000
	L 9	-225	20000
	B 8	-325	15000
	B8C	-325	15000
	B8P	-325	15000
B164 Nickel - copper alloy forgings	A	-325	20000
B160 Nickel forgings, low carbon nickel		-325	10000
B247 Aluminum alloy forgings	GB 11B	-325	9000
Aluminum alloy forgings	GS 11A	-325	9500
	M1A	-325	3350

NOTE:

In the above tabulation where the specification covers both seamless and welded pipe, only the stress value of the seamless material is shown. The stress value for welded pipe shall be the stress value of the seamless material multiplied by the following joint factor:

- (a) For resistance-welded pipe — Joint factor .85
 (b) For fusion-welded pipe with weld metal deposited from one side only — Joint factor .85
 (c) For fusion-welded pipe with weld metal deposited from both sides — Joint factor .90
 (d) Where welded pipe joint is completely radiographed as required by the appropriate specifications — Joint factor 1.00
 Where the tabulated specification covers only welded material, the stress value shown includes the .85 joint factor.

TABLE 2*

A=Mean coefficient of Thermal Expansion by 10⁶ (in/in/°F)
 B=Linear Thermal Expansion (in/100 ft)

Material	Temperature Range			
	70 to 200	-50 to 70	-150 to 70	-325 to 70
Carbon steel; Carbon-molybdenum steel	A 6.38	5.80	5.50	5.00
low-chrome steels (thru 3% Cr)	B 0.99	0.84	1.45	2.37

TABLE 2 (Continued)

Intermediate alloy steels: 5 Cr, Mo, thru 9 Cr, Mo	A 6.04	5.45	5.20	4.70
	B 0.94	0.79	1.37	2.22
Austenitic stainless steels	A 9.34	8.90	8.60	8.15
	B 1.46		2.27	3.85
Straight chromium stainless steels; 12 Cr, 17 Cr, and 27 Cr	A 5.50	5.00	4.70	4.30
	B 0.86	0.72	1.24	2.04
25 Cr — 20 Ni	A 7.76	7.20	6.85	6.35
	B 1.21	0.98	1.81	3.00
Monel 67 Ni — 30 Cu	A 7.84	7.15	6.75	5.55
	B 1.22		1.79	2.62
Monel 66 Ni — 29 Cr, Al	A 7.48	6.80	6.45	5.35
	B 1.17	0.98	1.70	2.53
Aluminum	A 12.95	11.60	10.90	9.90
	B 2.00	1.67	2.88	4.68
Gray cast iron	A 5.75			
	B 0.90			
Bronze	A 10.03	9.15	8.75	8.40
	B 1.56	1.32	2.31	3.98
Brass	A 9.76	8.95	8.50	8.20
	B 1.52	1.29	2.24	3.88
Wrought iron	A 7.32	6.65	6.30	5.70
	B 1.14	0.96	1.67	2.70
Copper-Nickel (70-30)	A 8.54	7.80	7.40	6.65
	B 1.33	1.13	1.95	3.15

* These data are for information and it is not to be implied that materials are suitable for all the temperature ranges shown. Temperature limits are set out in Table 1.

TABLE 3*

E = Modulus of elasticity — multiply by 10⁶

G = Modulus of torsional rigidity — multiply by 10⁶

Material	Modulus 70	Temperature, Deg F			
		0	-100	-200	-325
Carbon steels with carbon content 0.30% or less	E 27.9	28.6	29.0	29.5	30.0
	G 10.8	11.1	11.2	11.4	11.6
Carbon steels with carbon content above 0.30%	E 29.9	30.2	30.4	30.6	31.0
	G 11.6	11.7	11.8	11.9	12.0
Carbon-molybdenum steels, low carbon-molybdenum steels through 3% Cr	E 29.9	30.2	30.4	30.6	31.0
	G 11.6	11.7	11.8	11.9	12.0
Intermediate chromium-molybdenum steels (5%-9% Cr), austenitic stainless steel	E 27.4	27.7	28.1	28.5	29.4
	G 10.6	10.7	10.9	11.0	11.4
Straight chromium stainless steel (12 Cr, 17 Cr, 27 Cr)	E 29.2	29.5	29.8	30.3	30.8
	G 11.4	11.5	11.6	11.8	12.0
Wrought iron	E 29.5	29.8	30.0	30.2	30.6
	G 11.8	11.9	12.0	12.1	12.2
Gray cast iron	E 13.4				
	G				
Monel 67 Ni-30 Cu 66 Ni-29 Cr, Al	E 26.0	26.2	26.4	26.6	26.8
	G 9.5	9.6	9.7	9.7	9.8
Copper-nickel 80-20, 70-30	E 18.9	19.2	19.5	20.0	20.5
	G				
Aluminum	E 10.6	10.7	10.9	11.1	11.3
	G 3.9	3.9	4.0	4.1	4.2
Copper 99.98% Cu	E 16.0	16.2	16.5	16.7	17.0
	G 6.0	6.1	6.2	6.3	6.4
Commercial brass 66 Cu, 34 Zn	E 14.0	14.2	14.5	14.7	15.0
	G 5.3	5.4	5.5	5.6	5.7
Leaded tin bronze 88 Cu, 6 Zn, 1.5 Pb, 4.5 Zn	E 13.0	13.2	13.5	13.8	14.2
	G 4.9	5.0	5.1	5.2	5.4

* These data are for information and it is not to be implied that materials are suitable for all the temperature ranges shown. Temperature limits are set out in Table 1.



by Cyril Ainsworth

DINNSA

(Does Industry Need a National Standards Agency?)

Mr Ainsworth has served for many years as Technical Director of the American Standards Association. He is now Deputy Managing Director and Assistant Secretary.

IN the first of these columns (January, 1958) we said: "... from one point of view DINNSA did not paint a complete picture of ASA. Industry needs a national standards agency, but so does government." This suggests a question that has bobbed up from time to time ever since ASA was established in 1918:

Would it not be better all around for the Federal Government to provide the means for correlating the standardization work of different organizations whenever such need arises, thus making an organization like ASA unnecessary?

DINNSA, published by ASA in 1932, stated that "clearing house functions require a central agency which must be maintained either by government or by industry (with the cooperation of government)." We might add "... a central agency operated both by government and industry ..." It is easy to see that governmental direction and support of the central agency may seem very attractive, since it offers a means of distributing the incidence of cost through taxation, and a means of operation through a simple executive action by bureau personnel. In addition, some government people have expressed the belief that since standardization can so vitally affect the national economy, national standardization should be controlled by government to insure that the standardization process is not misused and in possible violation of the anti-trust laws.

The early experience of ASA on this question is significant. The committee which brought ASA (then the American Engineering Standards Committee) into existence believed that the fundamental of national standardization is coordination of the views of all groups. It set up a form of organization that would prevent control by any group, governmental or industrial. It incorporated into the procedures for approving standards the consensus principle which when properly applied would insure operating in the public interest.

It recognized that government as a consumer had a legitimate interest in the development and approval of standards on the national level. It conceded that government should assume the role of protector of the public. However, it did not believe that all these considerations

were so significant that government should dominate or control national standardization.

Recognizing the interest of government in national standardization, the departments of War, Navy, and Commerce were invited to membership on a founder member-body basis, clearly indicating that control should rest in neither the governmental nor industrial groups. It might be said that greater responsibility was vested in industry in that government paid no dues, making it necessary for industry to pay the bills.

In the first important job undertaken—the safety code program—it was found that neither governmental direction nor direction by technical societies (the only groups having membership in AESC at that time) commanded sufficient industrial confidence to permit successful handling of the work. Such confidence was established only by remodeling the organization to secure joint representational control by technical societies, trade associations, and government departments, each being on exactly the same footing as any other interested group. The state governments, which have legal jurisdiction in the matter of safety codes or regulations, favored this solution rather than federal government control.

The emphatic preference of industry for the present democratic set-up, eliminating all fears that any form of political control would creep in, has been repeatedly confirmed in the subsequent 38 years experience. During that period the present system of handling standardization work is notable for the continuous, active cooperation at the technical level between government and the ASA.

This democratic set-up of joint representational control was damaged somewhat when, in 1948, the governmental departments and agencies, which had increased in number from the original three to ten, withdrew as member-bodies of ASA. It is to be hoped that some means will be found to remedy this situation so that ASA can again operate, as originally intended (to which no fundamental objections have been raised) as the complete national coordinator of governmental, industrial, and technical standardization work.



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